VOL. XLV. No. 1 JANUARY 1960

MECCANO MAGAZINE

CRUSADERS OVER FUJIYAMA

15c

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967
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Length 5 ⅛ in.
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968
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Length 4 7/16 in.
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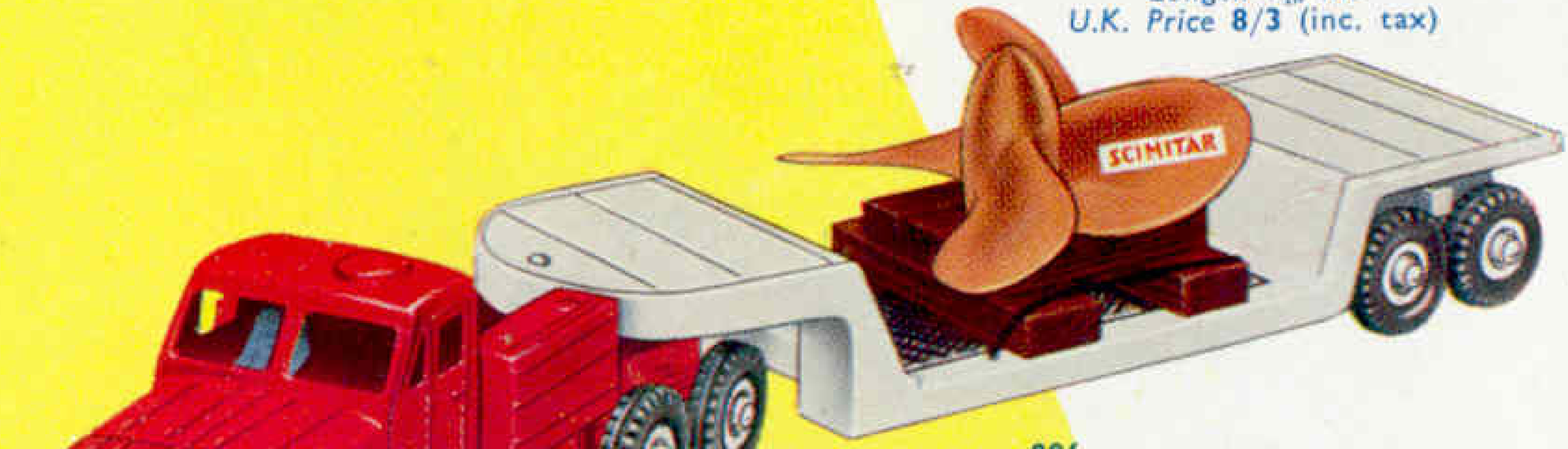

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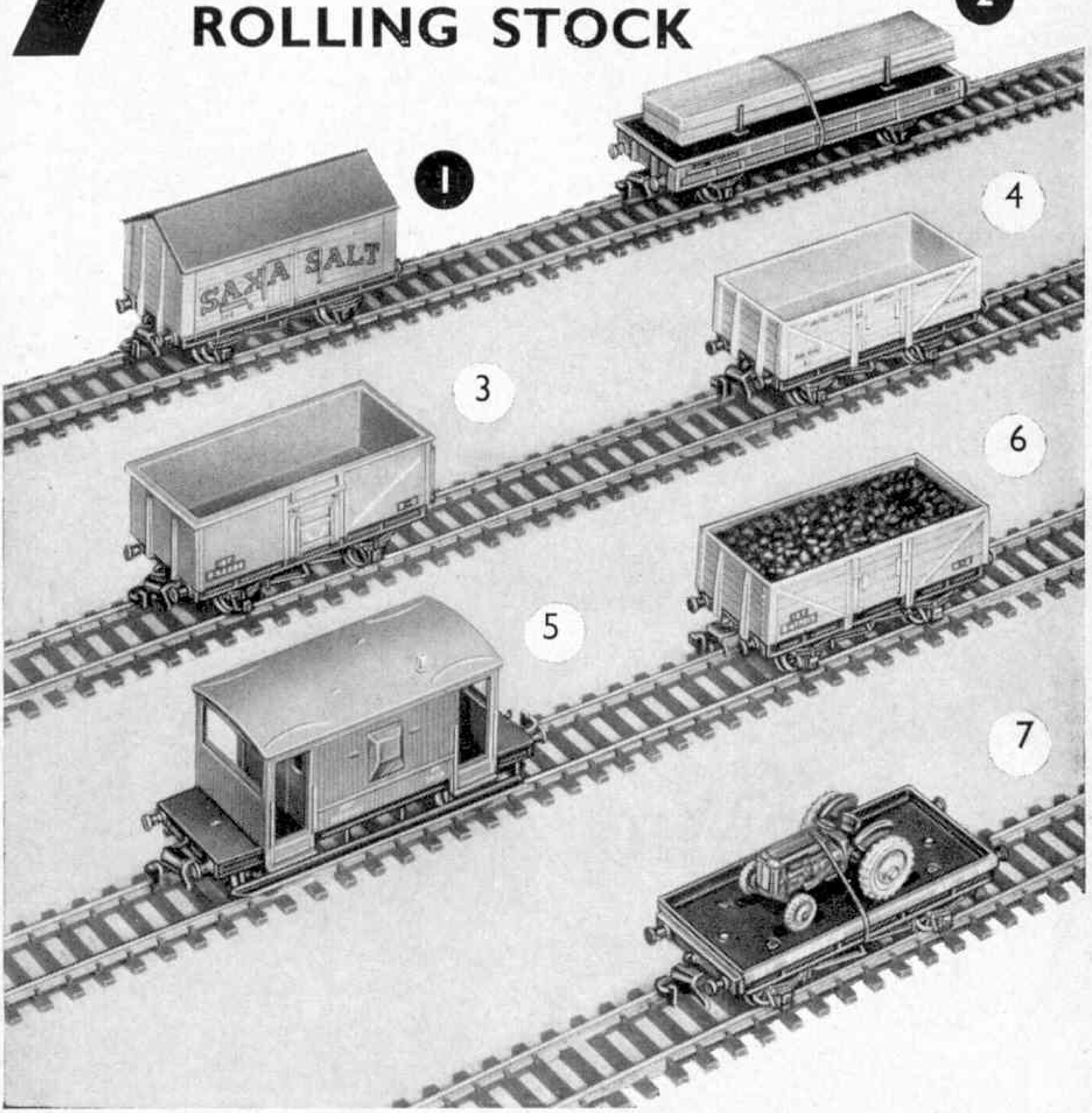

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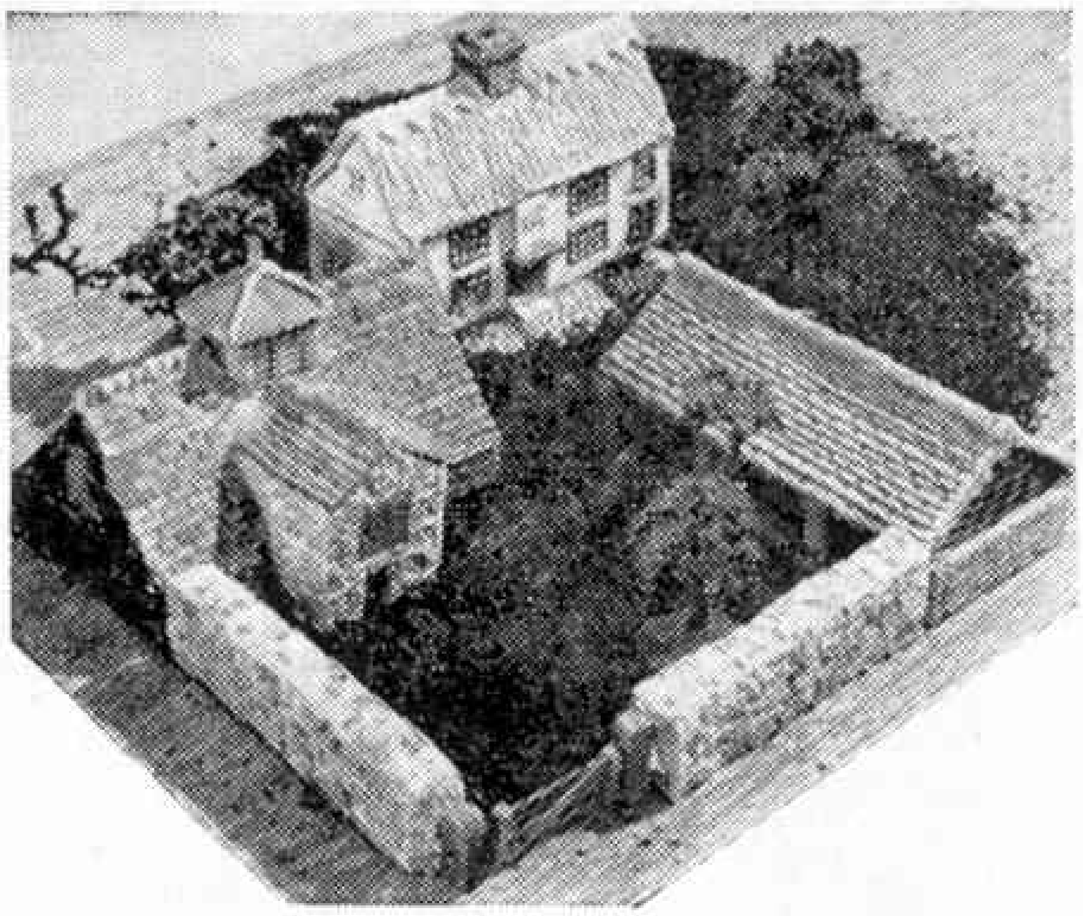

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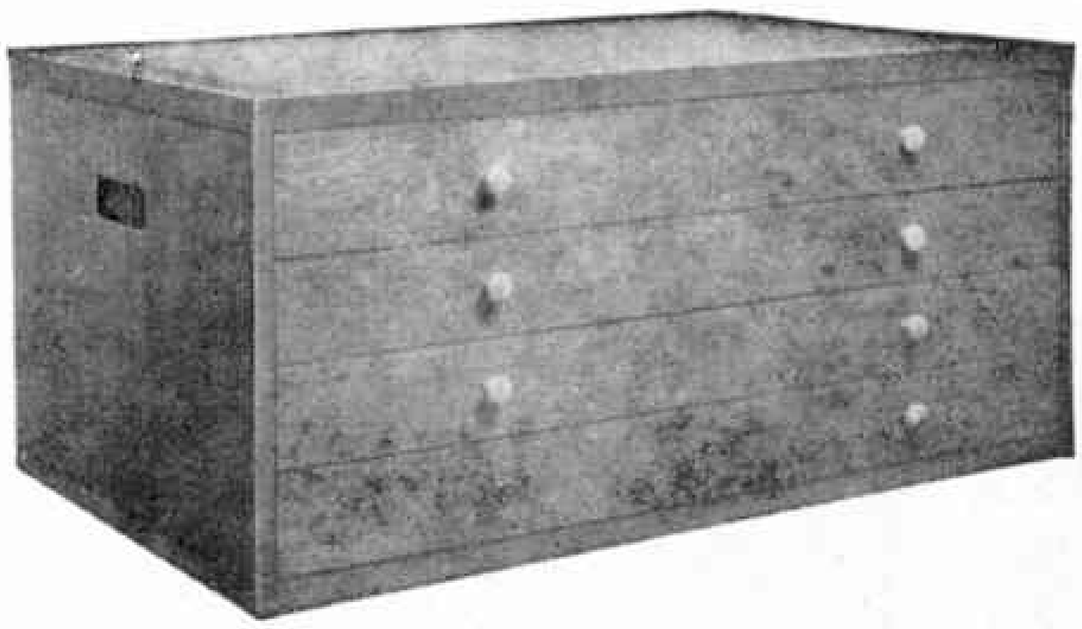

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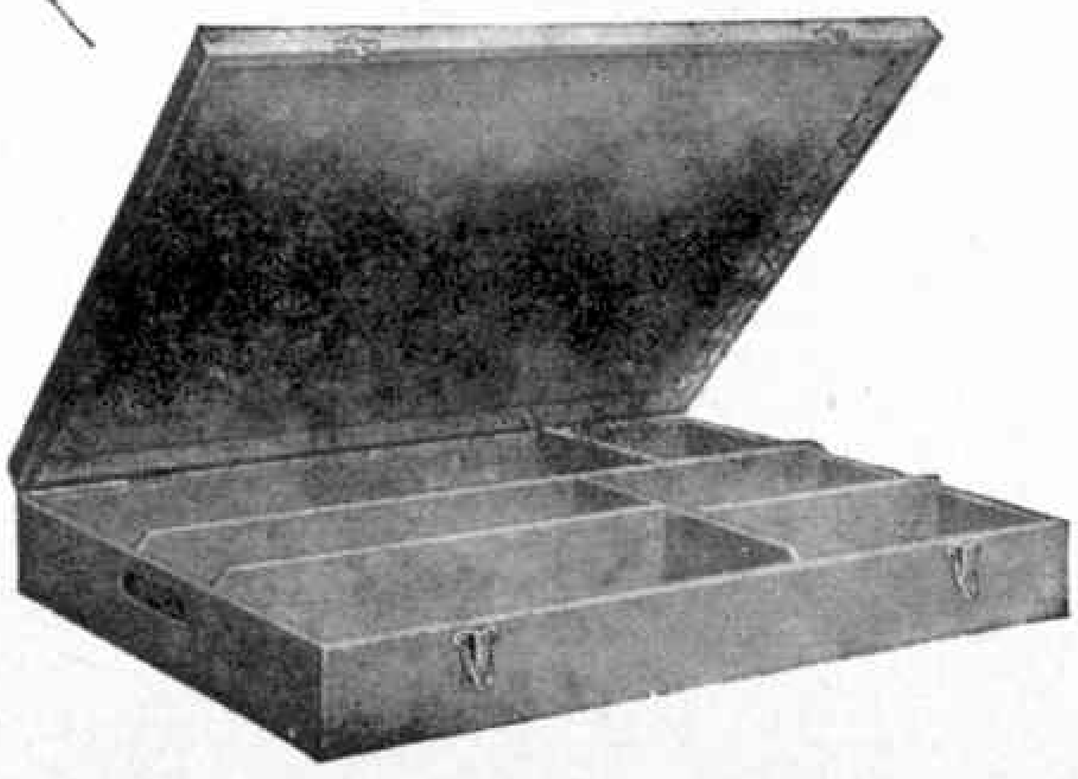

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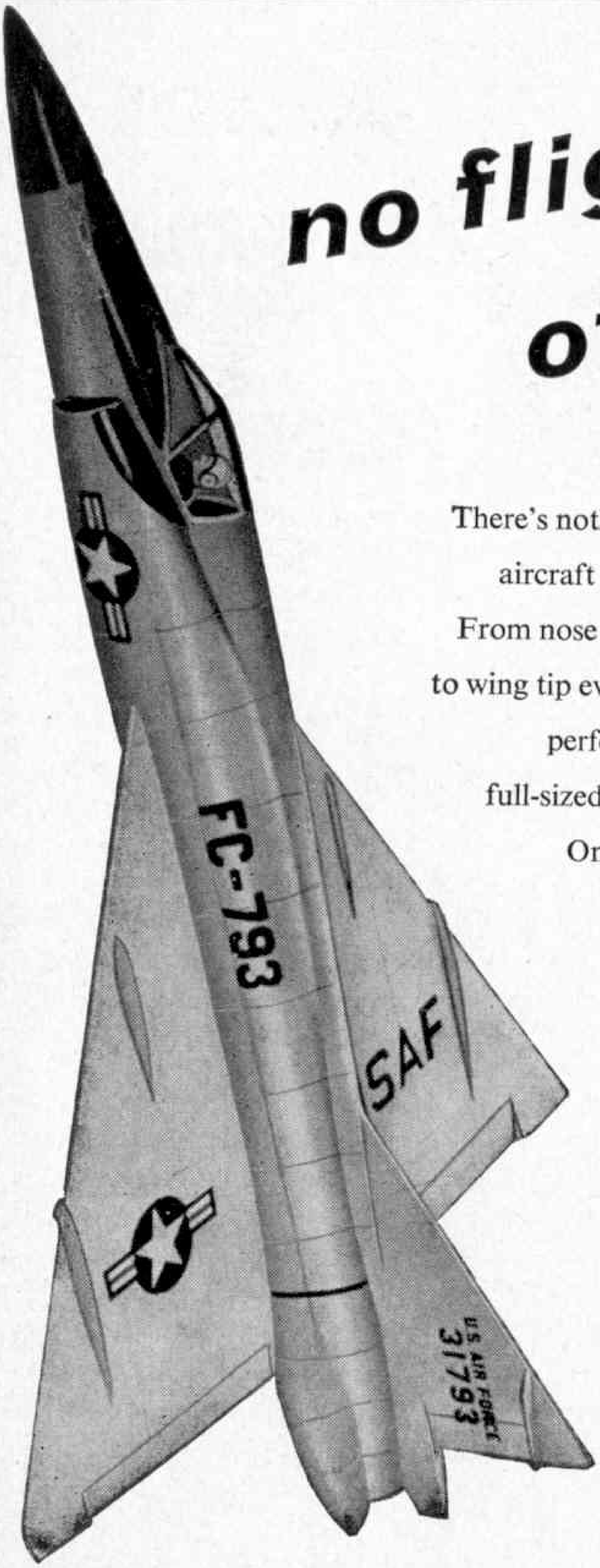

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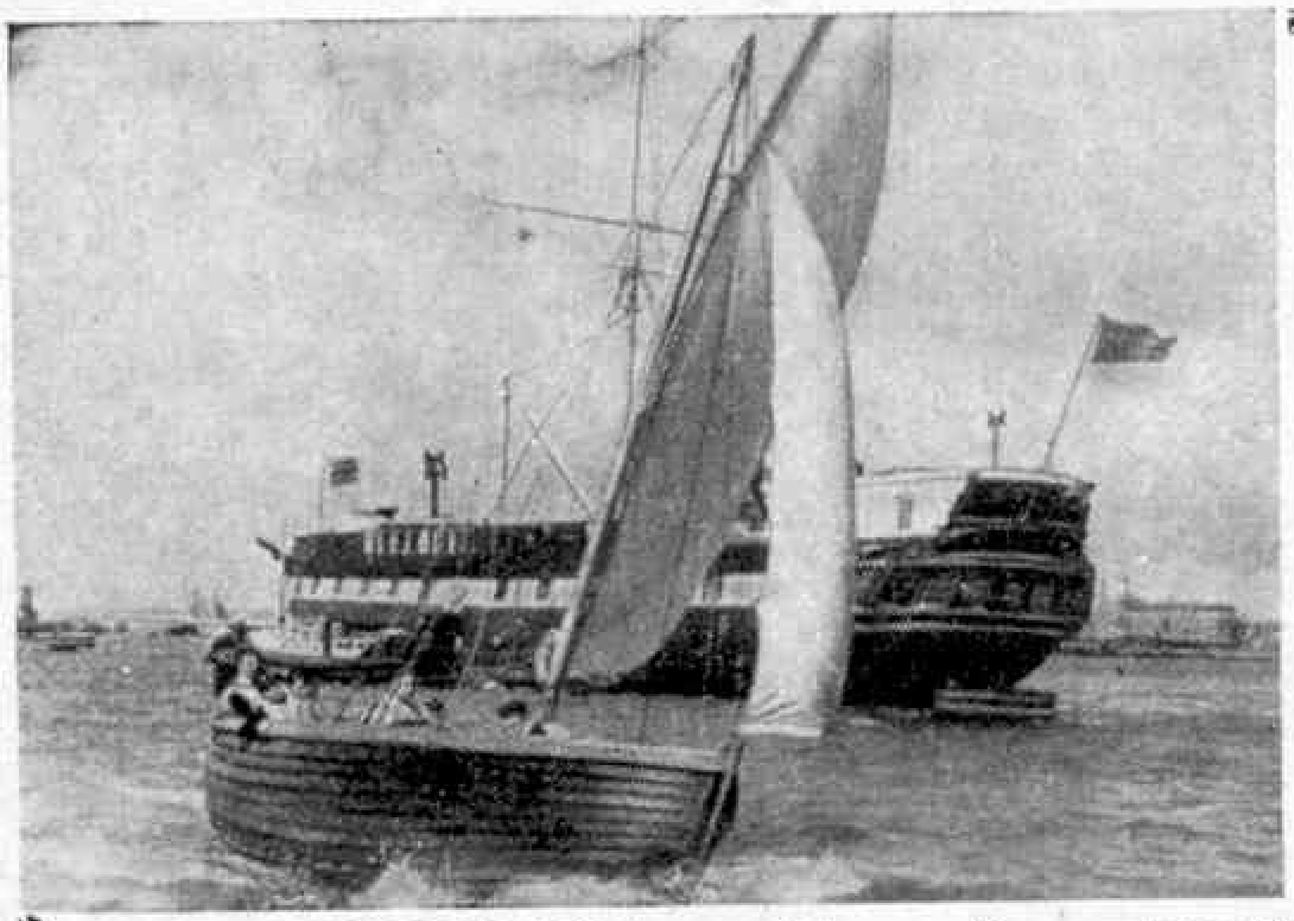

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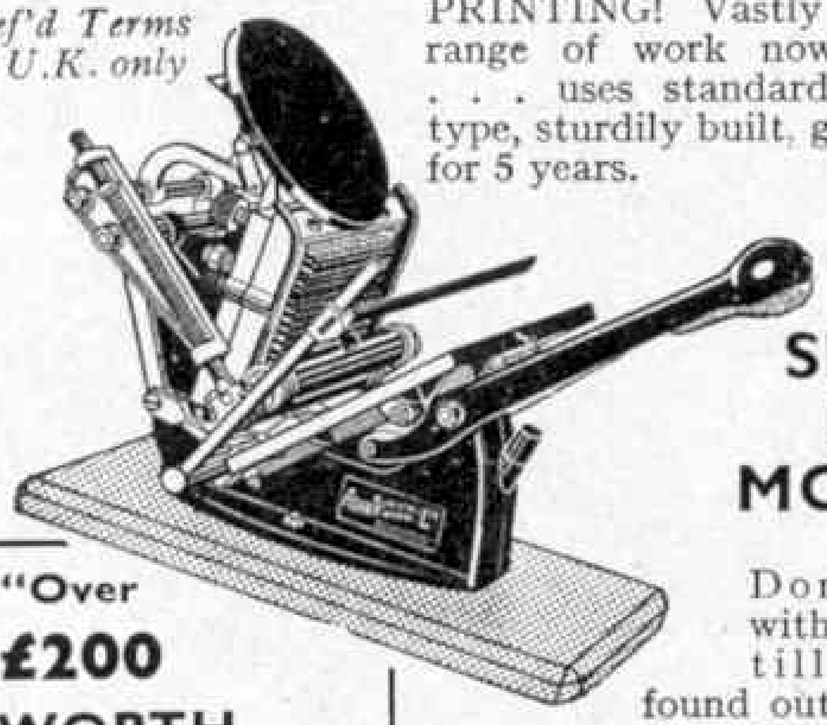

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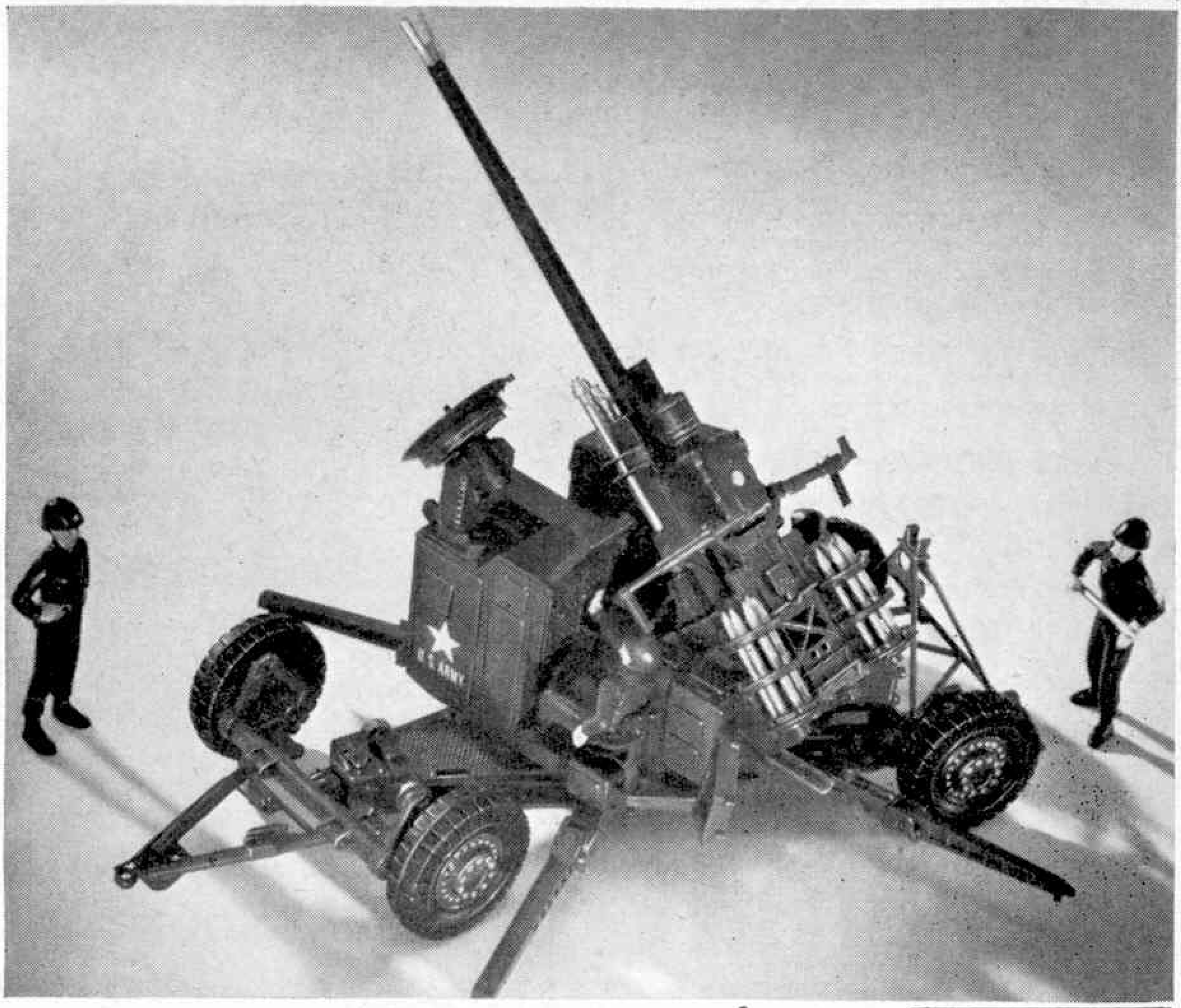

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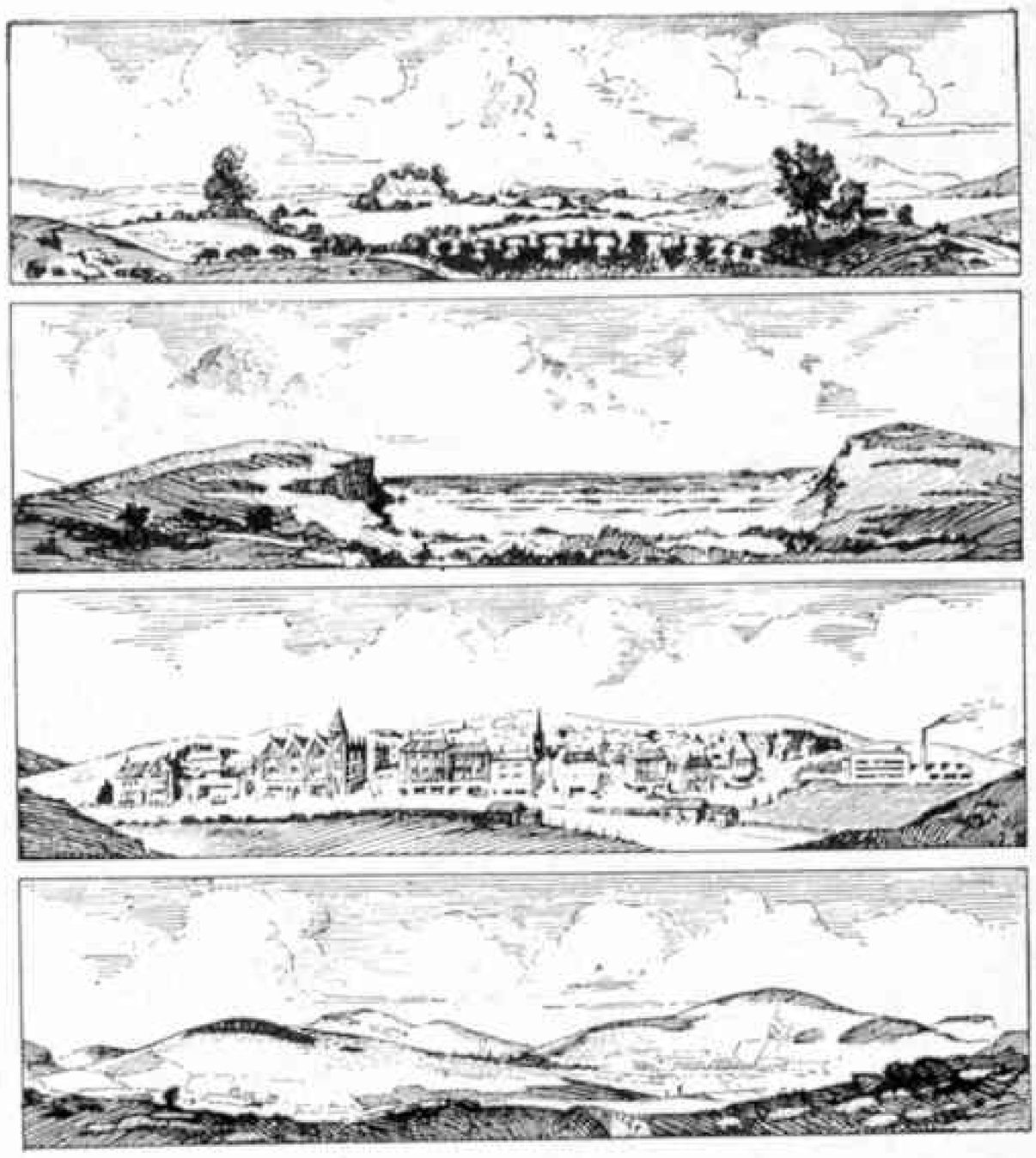

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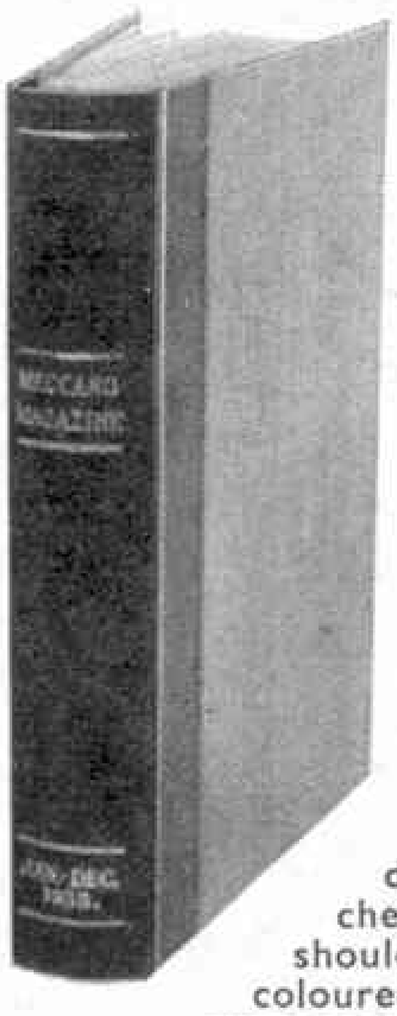

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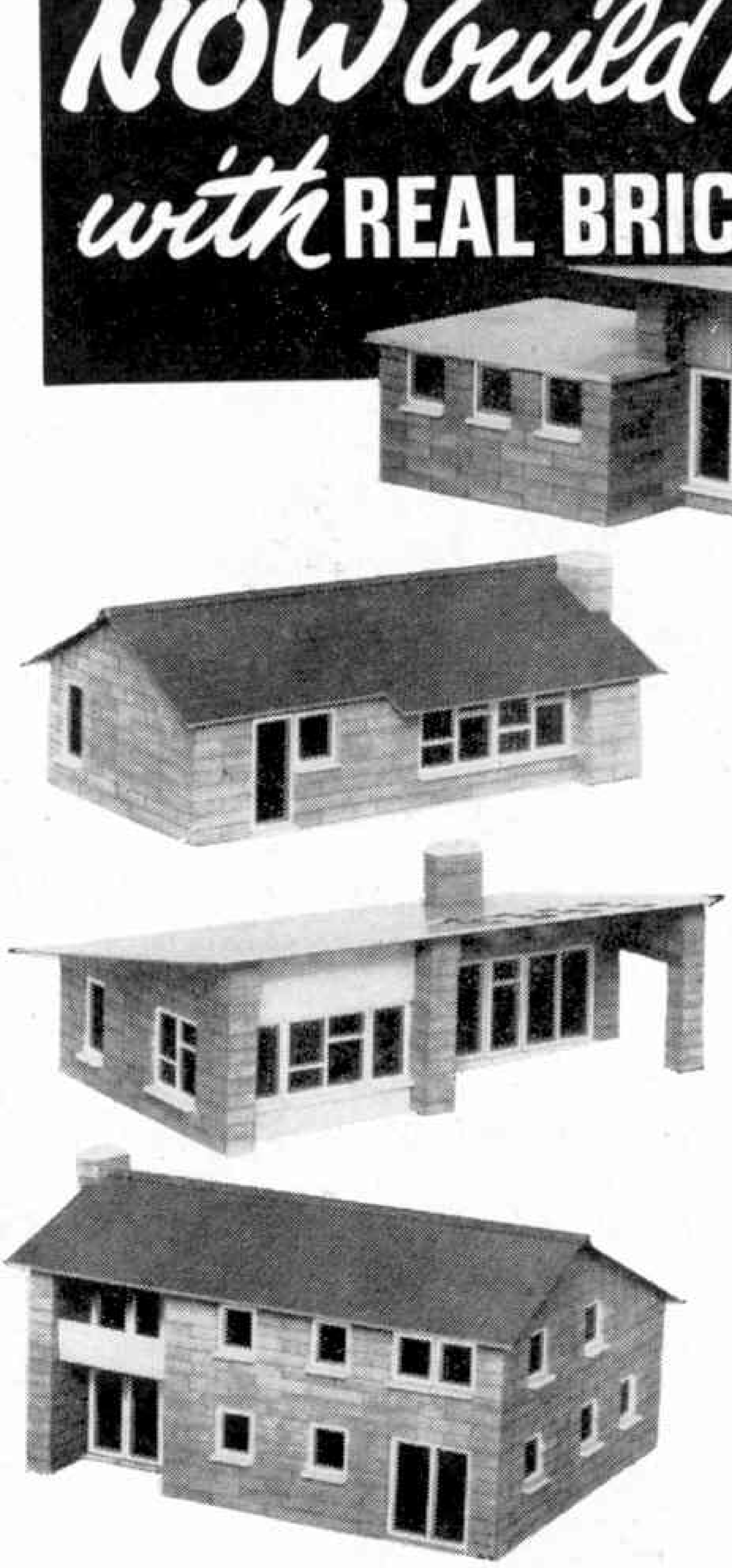

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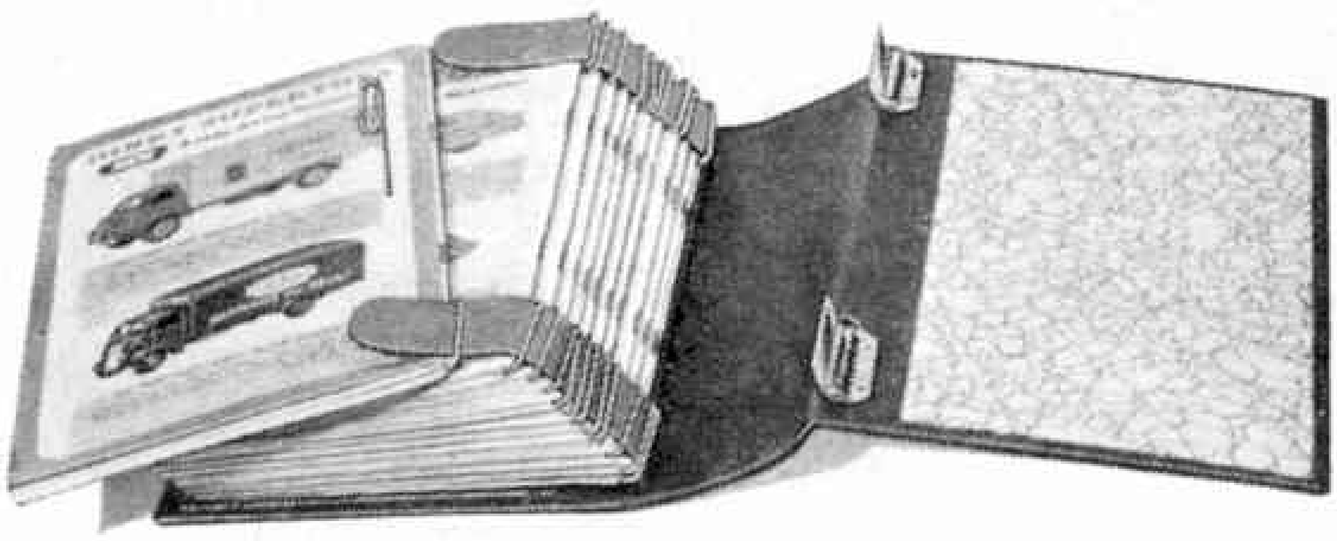

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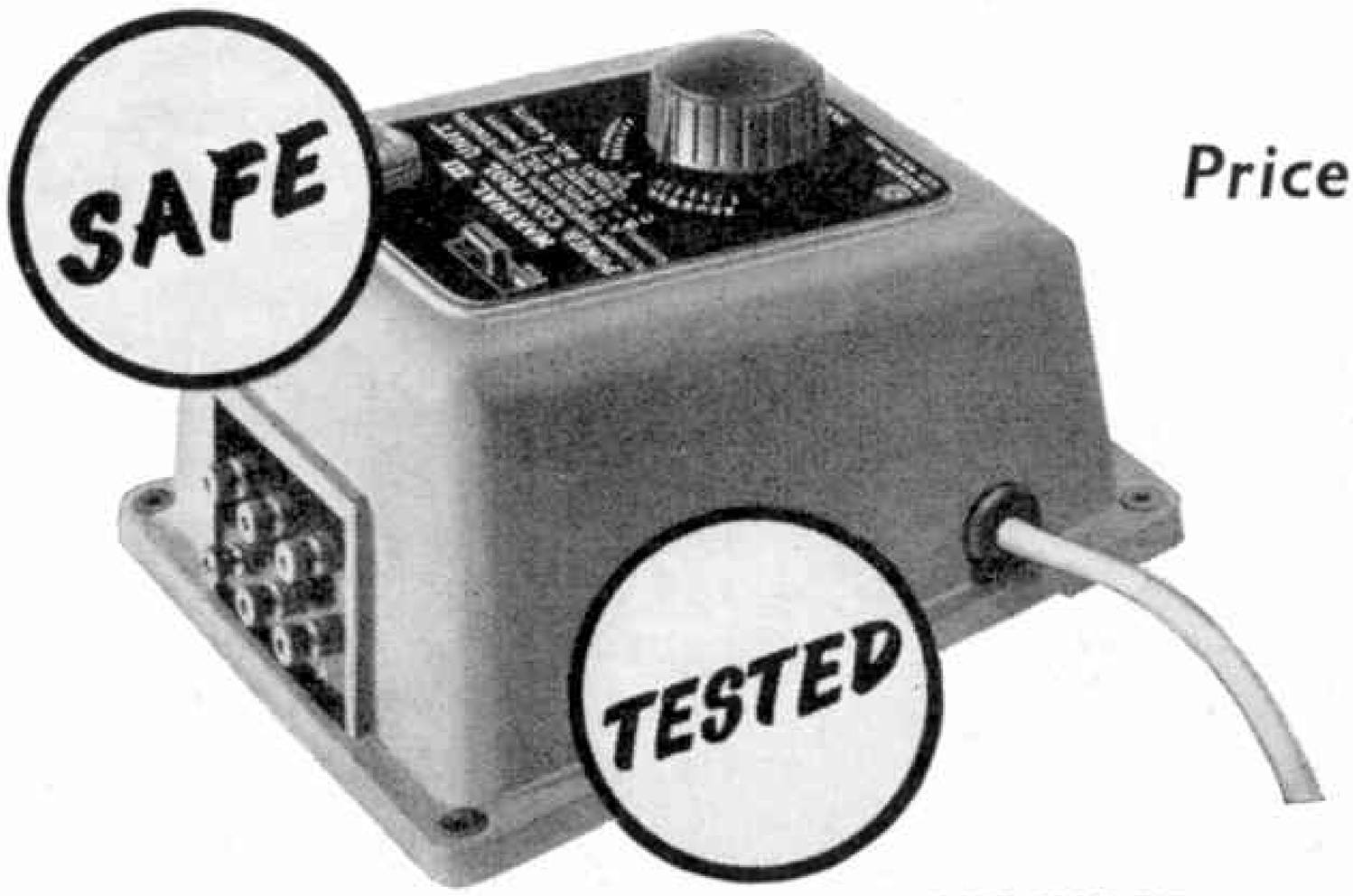

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MECCANO MAGAZINE

Editorial Office:
Binns Road
Liverpool 13
England

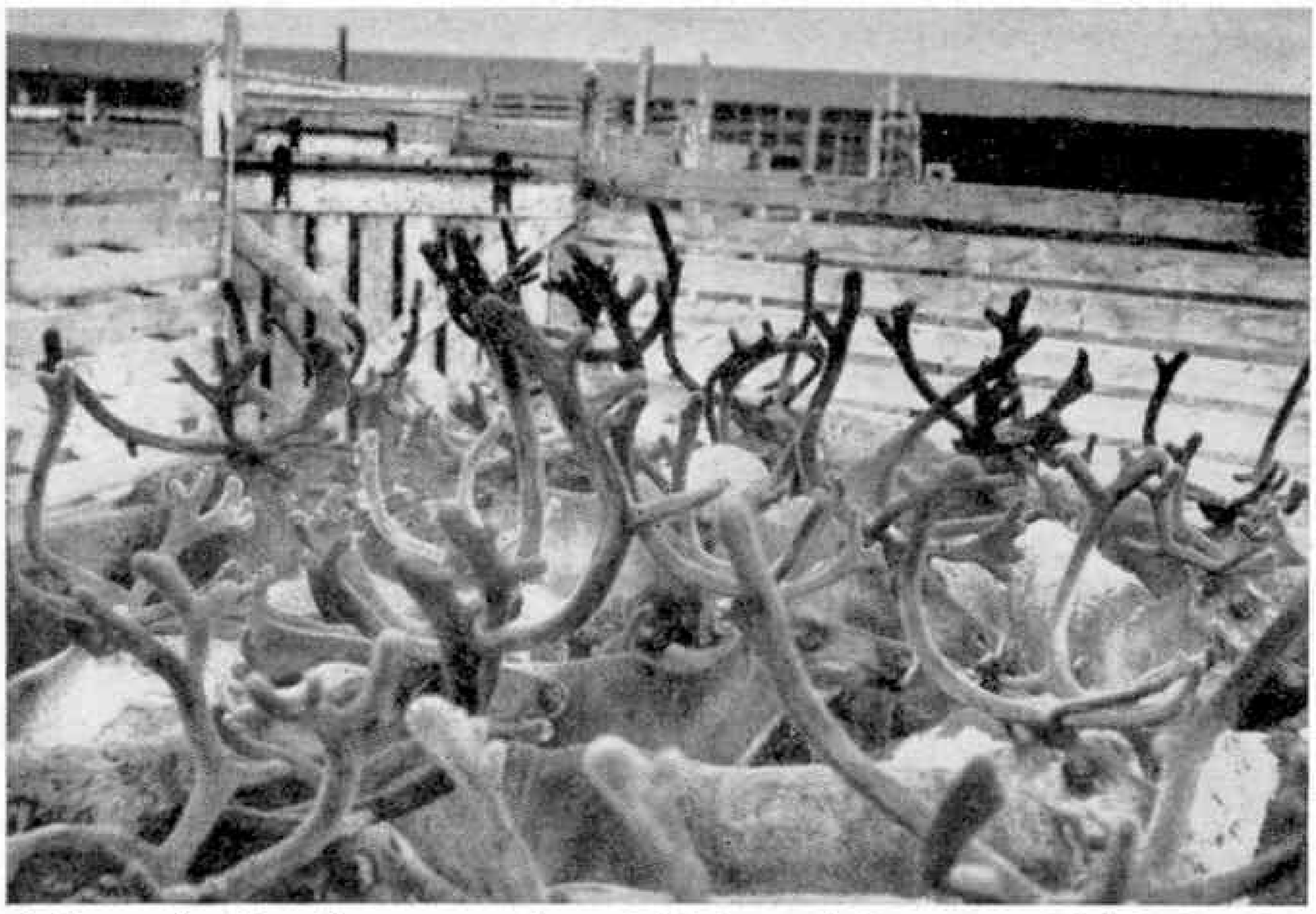
EDITOR : FRANK RILEY, B.Sc.

Vol. XLV
No. 1
January 1960

A Happy New Year

ONCE again I give myself the pleasure of wishing you all a Very Happy and Prosperous time during a New Year, now that of 1960. I know already that in return I have good wishes for the New Year from readers, as an unusually large number of them have sent me cards, or have expressed their goodwill to myself, the staff and the Magazine itself in letters they have written about our many and varied common interests. All in the Editorial Office and its Information Service will be only too glad to continue throughout 1960 to give information and advice that will help enthusiasts to enjoy the hobbies associated with the *M.M.* to the highest degree; and I am sure also that the general correspondence between us will be more copious, and more friendly and helpful, than ever before.

And what about the Magazine itself? Well, it is hoped to continue providing readers with an ever-growing range of articles and features that will be even more attractive and useful than in previous years.



A flurry of antlers from a round-up of Alaskan reindeer now settled in Canada. An article on these animals will appear next month.

Our cover this month has a double interest in that besides the fine aircraft seen in it there is the wonderfully symmetrical summit cone of one of the most famous volcanoes in the world, Fujiyama, in Japan. This is nearly 12,400 ft. high. It is free from snow only from July to September in each year, when Buddhist pilgrims ascend it, for to them the mountain is sacred. It was last in eruption about 260 years ago.

The aircraft seen flying over Fujiyama in the picture are Chance Vought Crusaders, supersonic naval fighters about which John W. R. Taylor writes, on page 11 of this issue, in an article on a remarkable device to make it easier for pilots to get down alive when they have to bale out from aircraft flying at speeds well above that of sound.

The Editor

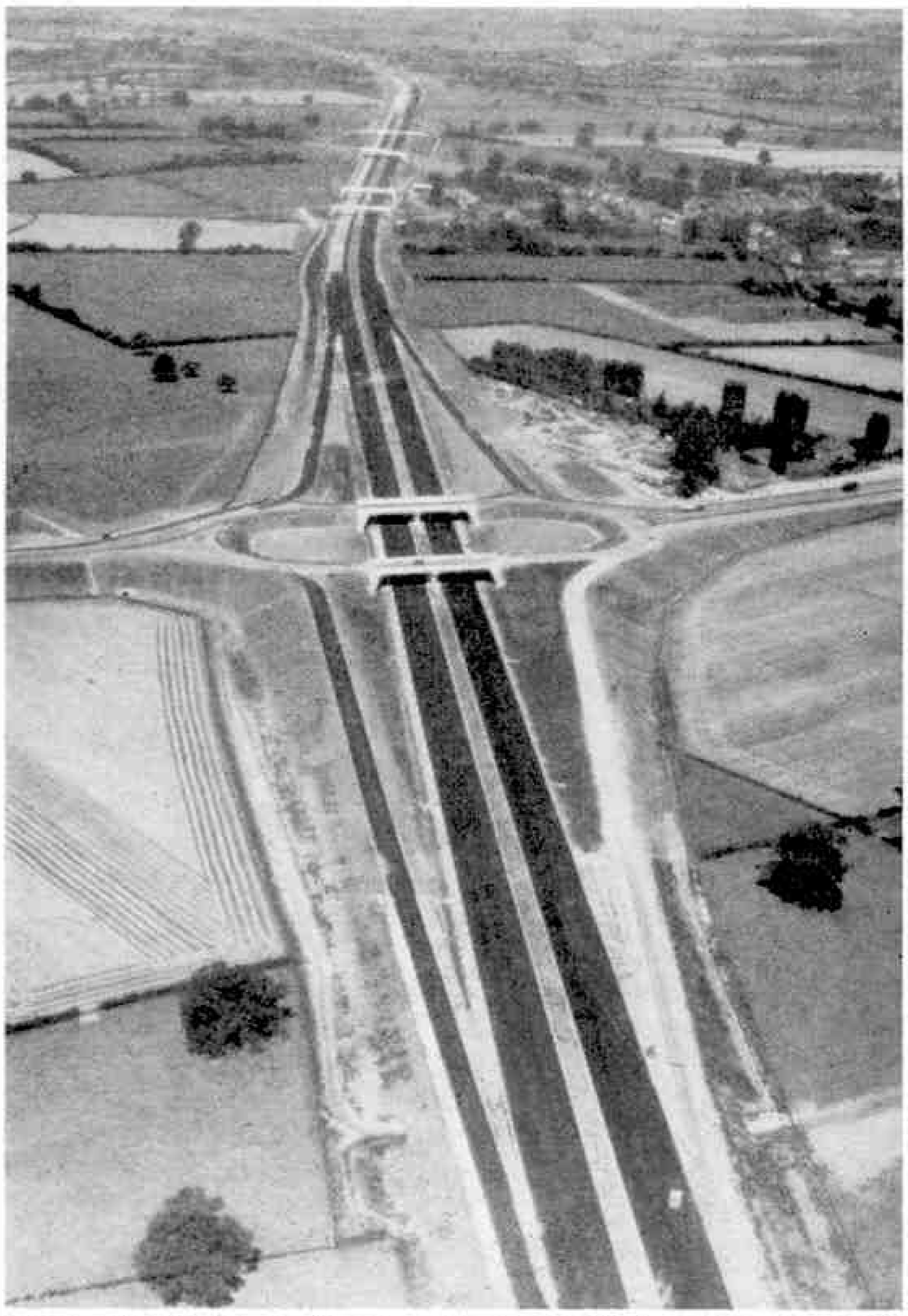
The Age of the Motorway

By J. A. G. Croxson

AUTO-ROUTE; Autobahn; Autostrada; Autopista; Expressway, Parkway, Thruway, Superway, Skyway—or what have you? The motorist pays his money and—sometimes—gets his choice. These are the names used respectively in France and Belgium, Germany, Italy, Venezuela and the United States, to describe the type of highway with which the motorist in Britain will now become increasingly familiar. For since 2nd November last, the 55 miles of the London to Yorkshire Motorway—stretching from just north of St. Albans to a point just south of Dunchurch, near Rugby—has come into operation.

Whichever designation is preferred, its meaning is, in effect, the same—a limited-access highway for motor traffic only, with two or more separate carriageways each wide enough for at least two streams of traffic. No traffic crosses these highways, and crossroads go either under or over. Drivers may enter or leave only at specially designed junctions.

The first highway of this type was completed in Italy in 1925 over a distance of 62 miles from Milan to the Lakes. Modernisation and additional construction begun in 1956 have brought the total Autostrada mileage in that country to well over 400. Western Germany, with a total of 1,400 miles of Autobahnen, is easily the most advanced in this field. In Western Europe as a whole there are at present estimated to be some 2,225 miles of motorways in existence. During the next 10 to 15 years it is expected that this total will be increased to a figure in the region of 4,000 miles.



M1 is not straight, as this view along it past its junction with A508 between Northampton and Stony Stratford shows. Its gentle sweeping curves prevent driving along it from becoming monotonous.

In the United States, toll roads gave impetus to the "pay-as-you-go" motorway. Since the Pennsylvania Turnpike was built, just prior to World War II, more than half of the individual States have built or are planning these privately-financed motorways. Some measure of the use made of these projects may be gauged from the fact that the volume of traffic anticipated by 1980 was reached in 1954, while the revenue accruing at that date was 26 years ahead of schedule.

The longest "motorway-type" highway in the United States is the New York State Thruway, completed in 1955 at a cost of 587 million dollars, and stretching over 427 miles from New York to Buffalo. The widest motorway envisaged is the 14-lane Chicago Super-highway, which is due for completion in 1962.

In Venezuela the Autopista, which connects the airport at

This fine two-arch bridge on Britain's motorway is "Structure 62", near Hanslope, Bucks.

Maiquetia and harbour at La Guaira with Caracas, the capital, has been described as "the greatest engineering project in South America since the Panama Canal". Certainly the new motorway has effected a marked improvement upon communications in Venezuela by replacing the former tortuous route which, despite its scenic beauty, involved 365 curves—many of the hairpin variety—over its 19 miles, and reduced the speed of the average journey to a mere 16 m.p.h.

The initial section of the London–Birmingham–Yorkshire Motorway, is the first sizeable contribution to Britain's 400 miles of motorway, most of which is scheduled for completion by 1962. The official inauguration date for this contract was 24th March, 1958—the cost some £16 million. The contract was granted by the Ministry of Transport and Civil Aviation to John Laing and Son Limited, the civil engineering contractors. Sir Owen Williams and Partners were the consultant engineers.

Shortly before the opening of the new motorway the writer was privileged to inspect the progress of this work from a helicopter. Taking off on a clear morning in a five-seater B.E.A. Westland Widgeon from John Laing's sports ground at Elstree, the route of the motorway was followed over its entire length, flying north on the east side to a point near Rugby, and returning south on the west side. Both flights were made at a height of only a few hundred feet so that the salient features of the highway, fly-over junctions, bridges and viaducts, were clearly visible. During the flight a running commentary on progress and development was maintained over the intercom by the pilot of the aircraft and the contractor's representative.

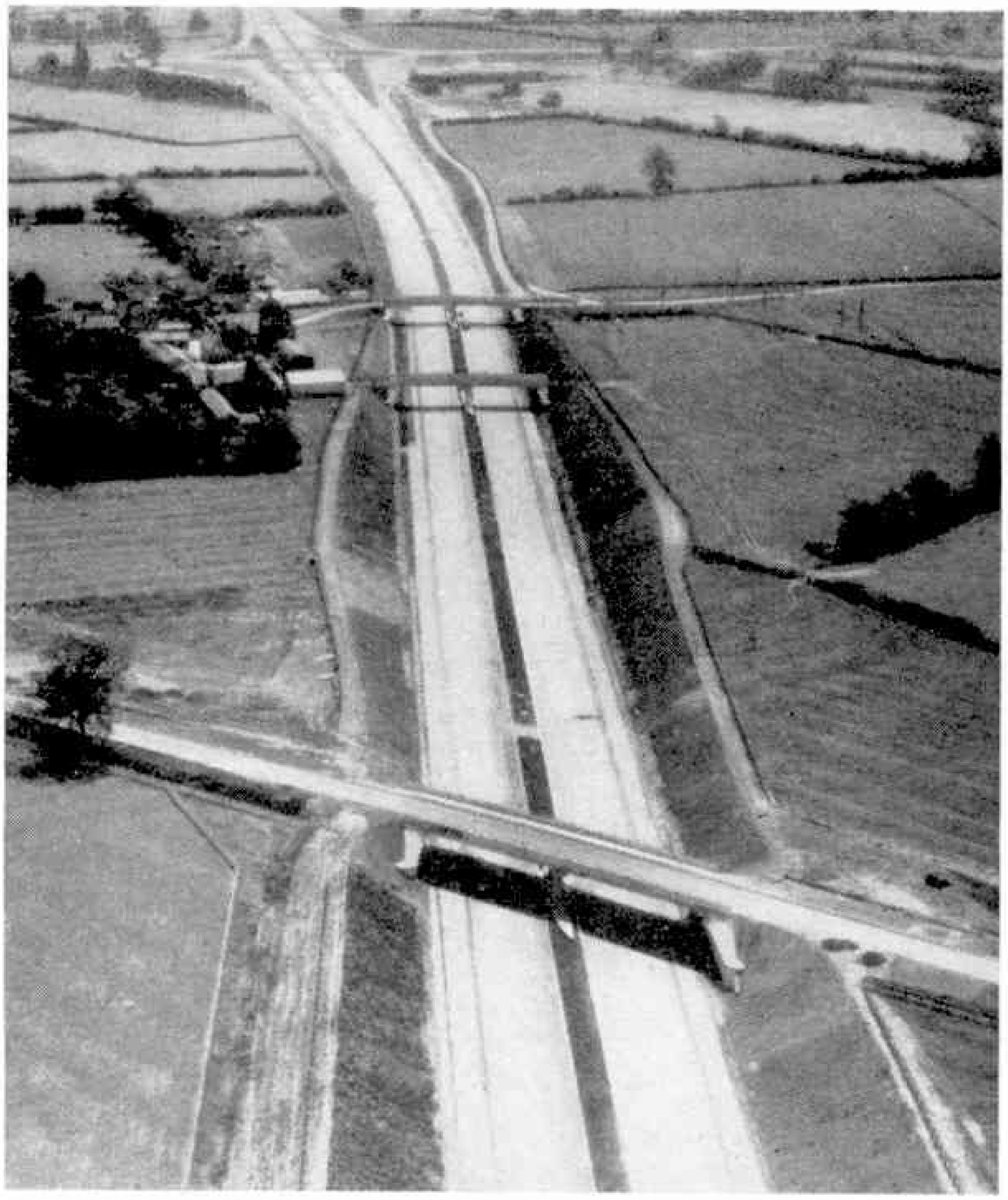
In contrast to the Autobahnen in Western Germany, and other European motor roads which run in monotonous, straight stretches for hundreds of miles, the impression of this first section of the London–Yorkshire motorway is one of skilful landscaping in gentle sweeping curves through the attractive countryside. Great care was taken at all stages to avoid disruption of rural activities and the demolition of dwellings. No fewer than 35 of the total number of bridges are of the access type, joining fields and farmlands separated by the motorway. In addition there are 20 cattle underpasses. Only five houses and one fish-and-chip shop were demolished to accommodate the motorway over its entire length.

Planning has been the keynote of the operation by the civil engineering contractors, and the entire construction programme has been scheduled and executed with the precision of a military operation. The contract has been controlled from the site headquarters at Newport Pagnell and four branch offices situated at strategic points along the motorway.

During our flight we set down on the motorway at Newport Pagnell to meet Mr. John Michie, the genial Project General Manager who, with the aid of maps, weekly target figures and progress charts, traced in a few minutes details of this high-speed construction operation. Charts revealed progress prosaically in columns and figures, but gave little indication of the physical effort and strain involved during the abnormally wet summer of 1958, when the

total rainfall during June, July and August was the heaviest within living memory, and when earth-moving and construction teams sweated in appalling conditions of wet and mire to maintain the target schedules. It is a tribute to the contractor's organisation that, at the time of my visit, with only a few weeks to go to the end of the contract, the whole operation was on schedule.

The basic work on the motorway is a process known to highway engineers as "cut and fill", which consists of moving earth from a point where it is not wanted to a point where it is, and sometimes of dumping it in a "balancing" area until it is required. In all, some 11 million cubic yards—about 16 million tons—of soil have been moved. This has been done on a grand scale by a huge armada of mechanical plant of some 80,000 horsepower, consisting of 73 scrapers, tractors, 150 excavators and a team of dump trucks, valued in all at over £5 million.



Another section of the motorway.

Plant of such magnitude requires something like six million gallons of fuel and lubricants to keep it running. Special provision was made by laying down storage depots at vantage points along the motorway, from which 15 four-wheel-drive tank wagons delivered fuel oil direct to vehicles and plant on the sites. Huge tonnages of bitumen have also been supplied for the final surface coating, which at the time of my visit was proceeding at a rate of 3½ miles each week.

The formation of the motorway covers an overall width of 105 feet and incorporates two carriageways each 36 feet wide, with a central reserve of 13 feet. At the extremity of each carriageway is an 8-foot-wide hard shoulder where vehicles can run off in the event of breakdown.

Construction consists of a 6-inch granular sub-base, 14 inches of dry lean-rolled concrete, a 2½-inch asphalt base course and a final 1½-inch wearing course of hot-rolled asphalt.

The majority of the 132 bridges, viaducts and culverts are of reinforced concrete; precast beams and steel superstructures have been used only on railway bridges.

More than 2 million cubic yards of concrete have been used on the roadway, while the bridge works have involved an additional half-million cubic yards as well as 10,000 tons of steel reinforcement. The total quantity of cement has exceeded 100,000 tons; deliveries were made in pressurised lorries to storage in ten 30-ton silos placed at strategic mixing points.

Combined with a high degree of mechanisation, the contractors have shown considerable ingenuity in designing forms in fully portable sections. This has contributed notably to speed and continuity of construction of culverts, bridges and marginal haunches.

From the air, the line of this motorway is clearly and impressively defined. Perhaps the most striking of the many distinctive features are the six fly-over junctions at points where the motorway crosses other main and minor roads. In contrast to the complicated fly-over (*Continued on page 52*)

Back from the Sea

Salvaging a Seventeenth Century Warship

By Trevor Holloway

ON 10th August, 1628, large crowds gathered on the landing stage in front of the King's palace at Stockholm, in Sweden, to bid God-speed to the finest ship of the Swedish Home Fleet as she set out on her maiden voyage. She was the *Vasa*, a 48-gun, three-decker ship of the line, stoutly built and finely decorated, and she made a fine sight as she was warped out from the quay. According to the records, the sea was calm, with a light south-westerly breeze gently billowing her sails. It was a festive day, indeed, and in addition to her full complement of 350 officers and men, there were a number of their relatives and friends aboard.

With top and mizzen sails set, the *Vasa* headed slowly towards open water. When clear of the cliffs that shelter the harbour to the south, her sails filled. Then suddenly, to the dismay of all who watched her progress, she was seen to heel over. A few minutes later she sank into 18 fathoms of water, and some 40 of her crew and passengers perished.

During the summer of 1959, just 331 years after the disastrous August day, the first serious attempt to raise the *Vasa* began. Its successful conclusion will form the final chapter to an exciting story that began two years earlier, when salvage experts and research workers met to determine how best the exacting task should be tackled. The discoveries so far made indicate that the *Vasa* was an impressive and, for the period, an extremely powerful vessel, equipped in the latest manner and richly decorated, as was customary in those days. But as to her appearance when ready for action, or the reason for her tragic loss, nothing is known.

When the *Vasa* finally reaches the surface —and there is little doubt she will—new light will be cast on the history of naval sailing ships and their development. At the present time, Nelson's flagship *Victory* is the oldest preserved, and indisputably identified, naval vessel in the world. She was launched at Chatham in 1765 and commissioned in 1788; but she was altered many times before retiring from active service in 1812, so the *Victory* we see at Portsmouth today is not truly representative of naval design in the days when she was built.

The *Vasa*, on the other hand, was commissioned more than a century before the *Victory* was launched. Furthermore, she has lain preserved from rot. In addition, her timbers are known to be worm-free, for the boring teredo, or shipworm, does not exist in Baltic waters.

Operations began when a team of specially trained divers went down to make

The ship about which this article is written is the "Vasa", which rested in the mud of the bed of the Baltic Sea for 331 years. In the picture at the head of the page wooden articles found in her are being carefully brushed with polyglycol to prevent their drying out too quickly. This photograph, and that on page 7, are reproduced by courtesy of Atlas Copco.

preliminary investigations. They found the *Vasa* lying some 100 ft. down in pitch darkness, half buried in clay and covered from stem to stern in silt and mud that had protected her. Had the vessel sunk off the English coast, the divers would have had little difficulty in gaining a good idea of the vessel's appearance, but the waters of Stockholm harbour are dirty brown and so clouded that the 200-watt mercury vapour lamps used could only penetrate a few feet. The moment the divers started work and disturbed the slime, visibility dropped to nil.

This meant that divers have had to work by sense of touch. They groped about with their hands, and on returning to the surface were interrogated by experts about what they had felt, rather than seen. Piece by piece this jig-saw of information has been catalogued, and hundreds of sketches have been made, based on the divers' reports. In this way a general picture of the *Vasa's* hull has been built up, and it will be a matter of exciting interest to see just how accurate the sketches prove to be when her mighty oaken hull breaks surface some time during the next two years.

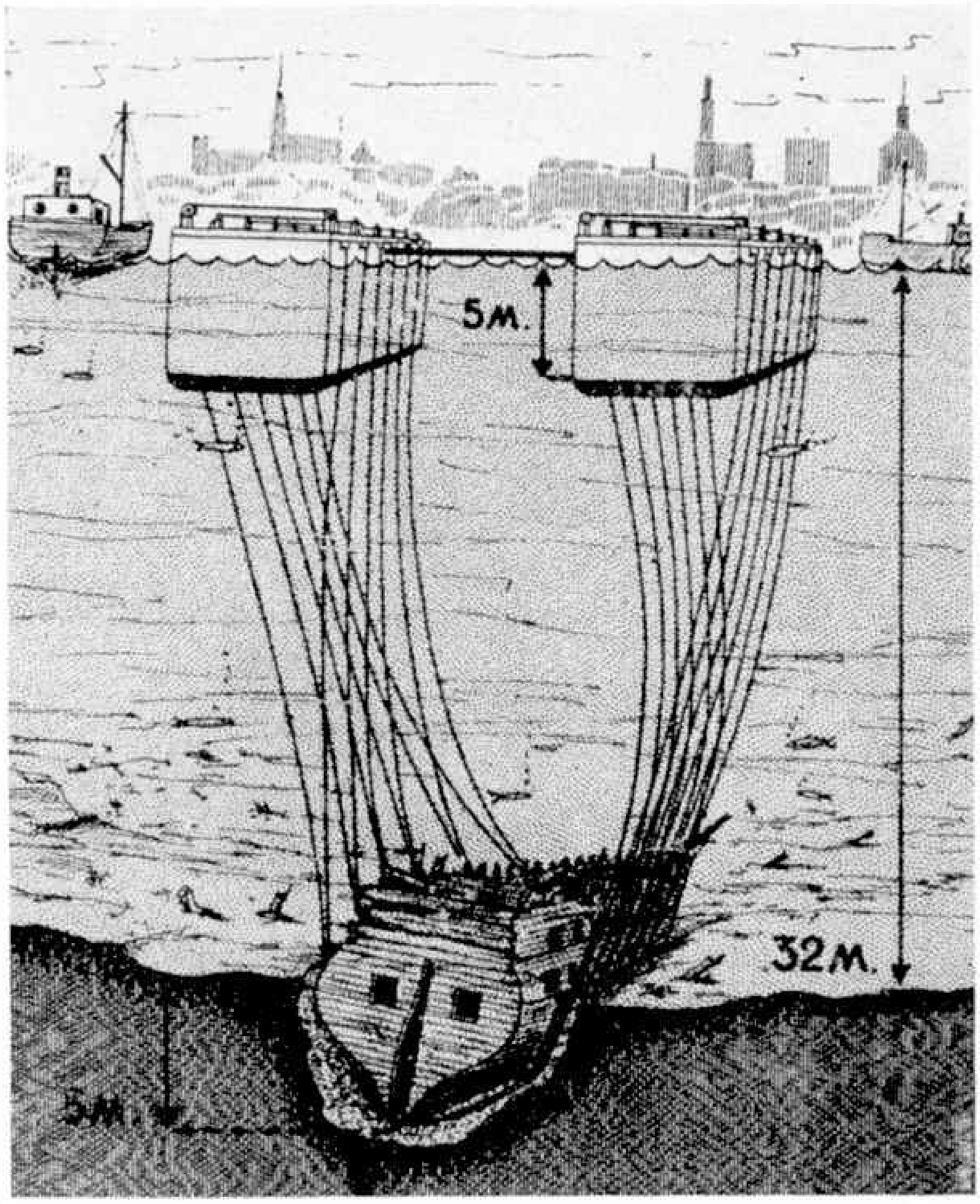
The salvage method employed in raising the vessel was to pass a series of steel cables under the vessel, and make these fast to two lifting pontoons on the surface. Before the salvage ship arrived on the scene the divers had the extremely hazardous task of boring six tunnels, each about 22 yards long, under the hull, through which to pass the specially designed steel cables attached to the lifting pontoons.

The first "lift" took place on 20th August of last year, and since then sixteen further "lifts" have been made. Each time the vessel was raised about 16 ft. and towed a little farther inshore until she grounded again. This process of lift and tow will continue until the *Vasa* comes to her final resting place in the Galavaret dock. It is slow work, for each time the vessel grounds she settles down into 10 ft. of tenacious bottom clay.

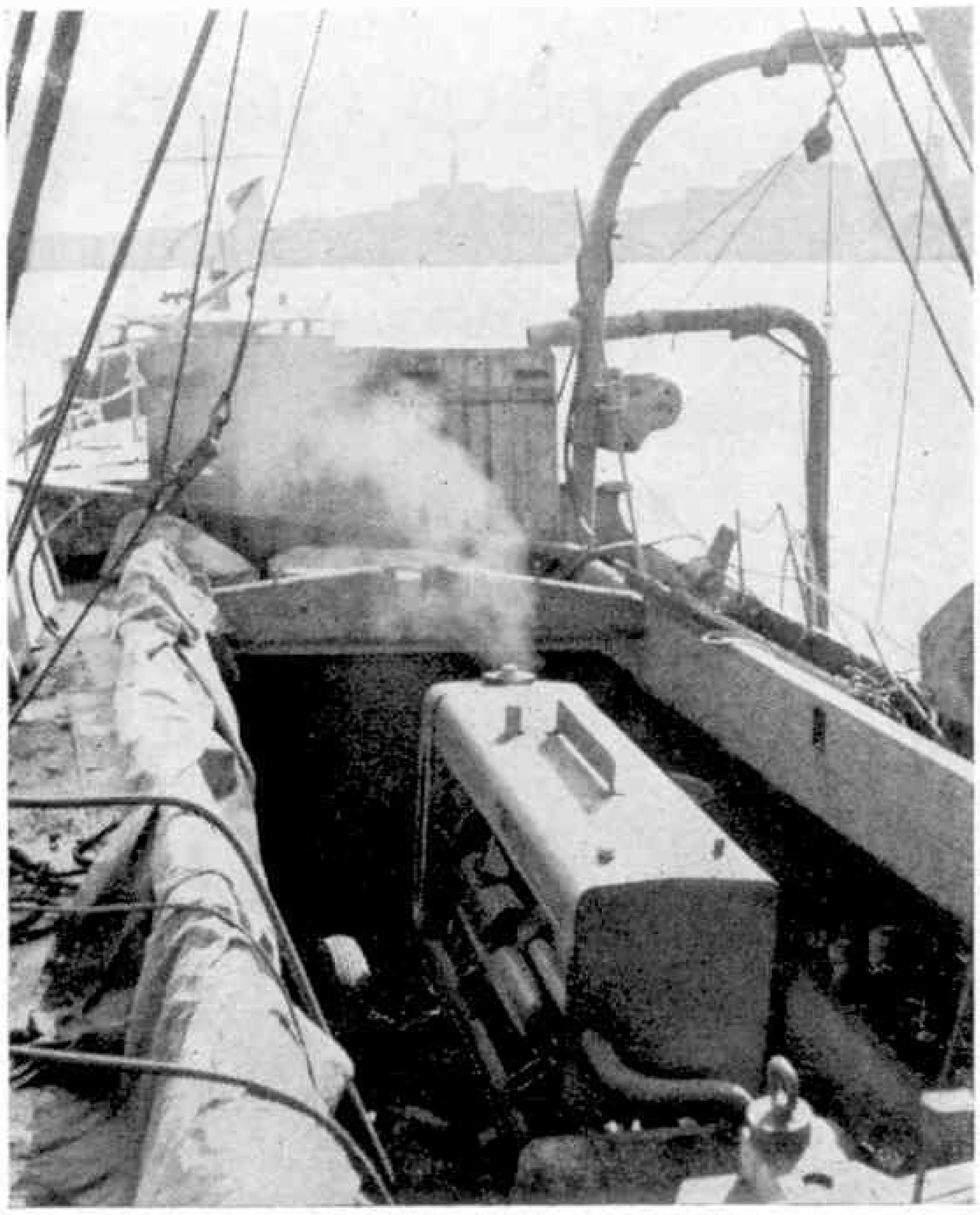
Operations were suspended towards the end of September last, and will be resumed again in spring of this year. At present the *Vasa* is lying in eight fathoms of water a short distance from the shores of Kastell Holmen, the naval depot at the entrance to Stockholm's inner harbour.

It was fortunate that the vessel was found to be lying on an even keel, for this fact made raising operations less difficult. The success achieved so far in clearing silt and slime, and freeing the vessel from the clay in which she was embedded, would not have been possible without compressed air. Fortunately, the Atlas Copco concern, specialists in compressed air techniques and equipment, has its headquarters just outside Stockholm, and has given its help to the Swedish Neptun Salvage Co., which placed its leading experts at the disposal of the *Vasa* Salvage Committee.

Compressed air is required for a number



How the "Vasa" was lifted from the bed of the Baltic. "Dagens Nyheter" Illustration, sketch by Rune Almquist.



Compressed air for use in the salvaging of the "Vasa" came from this Atlas Copco compressor.

of purposes, among them providing the divers with their air supply. Sweeping away the solid sediment is another, and this is then pumped to the surface, carrying with it any other solid matter it contains. Careful sifting and inspection of this suspended matter have already resulted in numerous valuable finds, and it is vital that no scrap of evidence, however small, shall escape examination.

Failure of the compressed air system would not only be disastrous from a salvage point of view, but could well have fatal consequences for the divers working in the cold and murky water below. Owing to the high standard of the equipment, and the fine work of the compressed air team, there has not been the slightest failure during two years of operation.

Next spring, when work is resumed, divers using high pressure air and water lines will start ridding the hull of the three centuries' accumulation of silt and mud with which it is filled. During this mammoth "rinsing-out" operation a great many Atlas Copco compressed air driven tools will be employed, with the firm's Arpic, a portable barge-mounted compressor, providing the vital air supply. The rinsing and removal of ballast is expected to occupy the whole of the summer working season this year until low temperatures and ice hazards once more bring work to an end. All being well, the *Vasa* will be in dry dock by the spring of 1961.

Exciting discoveries have been made each time the divers have gone down. Up to now more than 730 interesting and historically important articles of all shapes and sizes have been recovered, many of which are already on show in the Stockholm Museum of Naval History.

It is a matter for regret that the swirling dark brown waters above the *Vasa* have ruled out any possibility of filming operations. Had the water been clear, a first-class documentary film would have been possible, but all that film and TV cameras have managed to capture has been shots of less exciting work on the surface. But the cameras will have an exciting time when the *Vasa* appears above the surface for the first time.

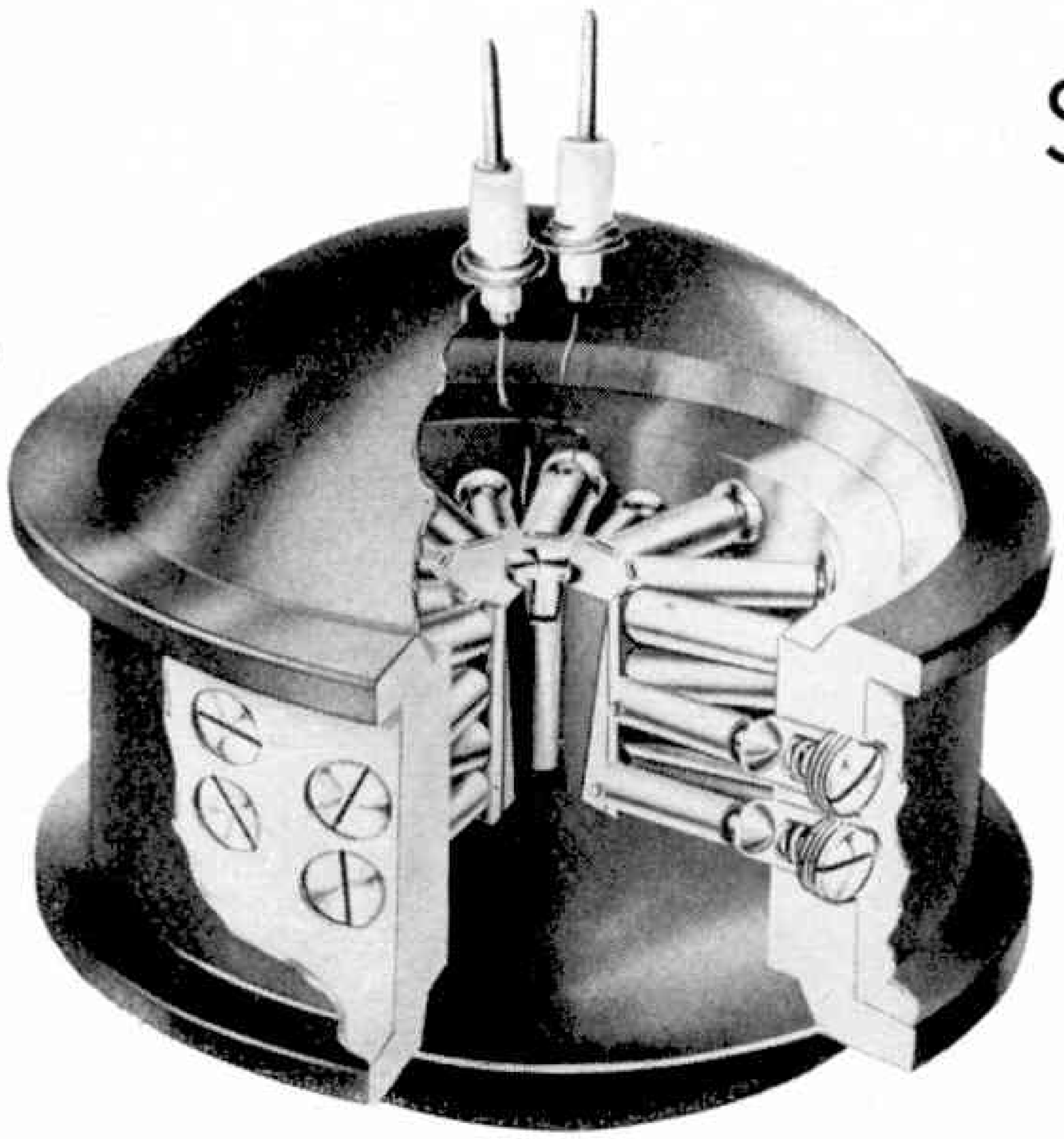
The Salvage Committee are confident that much will be learned of ship decoration and wood carving of the early seventeenth century. A foretaste has been the salvaging of the *Vasa's* imposing figurehead, a two-ton lion rampant some 16 ft. high. It was brought to the surface last summer and its condition suggests that the timbers of the wreck are still first-class.

At any rate, the lion was positively awe-inspiring as its head broke the surface of the water. Foam dripped from a still crimson mouth and the golden locks of the mane glistened in the sunlight—after 331 years in a watery grave!

"FUN WITH TOOLS"
By William Moore and Robert Cynar
(Edmund Ward, Price 11/6)

To most of us tools mean work, but boys will find from this book that they can provide real enjoyment.

The fun of course is that enjoyed by those who love to make things, and it is rightly pointed out that it is the greater if the thing made looks like the product of a skilled worker. This undoubtedly will follow careful adherence to the various rules for using simple tools laid down in the book, and anyone interested in such work cannot fail to find in it something that they would like to make. A jig-saw puzzle, a game, a bird feeding table, even a milk bottle carrier and a picnic box, these and many other things are described and illustrated, with full instructions for making them.



This drawing of SNAP-III, reproduced by courtesy of the Martin Company, shows the central radioisotope holder with thermoelements round it and two output connections at the top.

Space Notes

By
J. Humphries, B.Sc. (Eng.)
A.M.I.Mech.E., A.F.R.Ae.S.

SNAP-III for Electrical Power in Space

Space and weight are at a very high premium in all types of space vehicle, so electrical power supplies for operating transmitters and instruments must be as light, compact and reliable as possible. Although batteries are still used for some applications, for long-term operation of equipment there is generally only one practical solution, that is the production of electricity from the Sun's rays. This is done by use of the solar cell, a device that has only been developed during recent years. But these rely on a clear view of the Sun at not too great a range. For long-range probes for the outer reaches of the Solar system, or for instruments landing on Venus, which is eternally covered with cloud, some other power source would be needed.

Recently the Martin Nuclear Division has produced a unit called SNAP-III which produces electricity from a radioisotope, and can be used continuously over a very long period of time. In SNAP-III the radioisotope, Polonium 210, is in the centre and around it is a series of thermo-elements that produce electricity from heat. Particles emitted from the radioisotope are absorbed by surrounding material and in this process the heat required to work the thermoelements is produced. This first unit can produce 3 watts over a period of 280 days for a weight of only 4 lb. Light-weight batteries to perform the same duty would weigh nearly 200 lb.

The cost of these cells is likely to limit their uses. On present British prices the radioisotope in SNAP-III would cost almost £90,000. A more advanced unit to give 100 watts for nearly 10 years is now being developed.

A Mouse House

The American Garrett Corporation has built an air-conditioned, pressurised animal capsule to carry a space-pioneering mouse in orbit. The capsule weighs 5 lb. and maintains a pressure equal to that at 8,000 ft. The animal has a 30-day supply of pure oxygen stored under pressure in another container, which is metered into the capsule through a regulator. To re-circulate the oxygen, a tiny fan draws it out of the capsule through a carbon dioxide remover and a water separator.

The temperature will be controlled, if necessary, by means of a thermostatic control valve. This senses the temperature and cools the capsule by allowing water to vaporise, thus absorbing excess heat.

The firm has had 20 years' experience in air-conditioning and pressurising aircraft cabins and is now planning for the time when it hopes to provide similar cabins for man-carrying satellites.

Sailing the Interplanetary Seas

One of the oldest means of exploring the unknown may be applied in space—the sail. A recent analysis by a General Electric engineer shows that light streaming away from the Sun at 186,000 miles per second could exert a force on a solar sail in

much the same way that wind pushes on the sail of a boat.

When photons, as light particles are called, fall upon material, they are absorbed by it and exert on it what is known as "radiation pressure". Very thin plastic sheet, similar to that now available commercially, could be used for the sail. If this were sprayed with aluminium on one side it would act as a mirror, and the reflected light would produce twice as much pressure as it would if simply absorbed. The sail could be completely folded inside the space vehicle during the launching phase. Unfurling in space would not be difficult since there is no air resistance, so very large sails could be used.

For a 25 lb. satellite a 200 ft. square sail would produce an increase in speed of more than 300 miles per hour each day. This would enable a satellite to spiral slowly away from the Earth and to be sent on an extended space probing voyage. As in normal sailing, the attitude of the sails would need to be carefully controlled and an automatic system for furling and unfurling in space would be needed. Such sails could eliminate the need to carry propellents for use in space.

The engineer in charge of the development of the mouse house described on these pages points to a copper tube around the animal space capsule which is used to cool the oxygen. Photograph by courtesy of the Garrett Corporation.

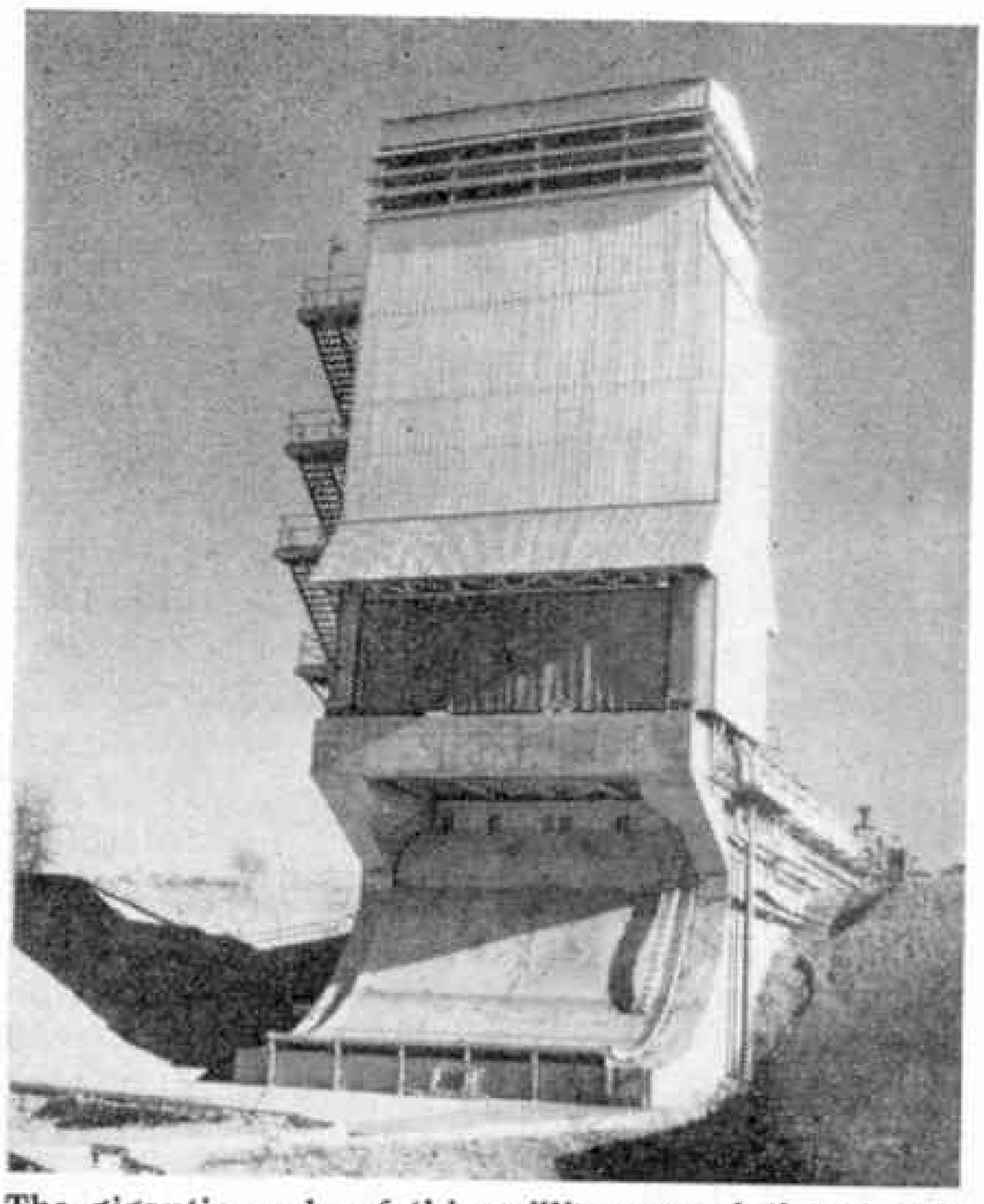
Testing Giant Rockets

It was announced in last September's *Space Notes* that Rocketdyne has a contract to build a 1,000,000 lb. thrust rocket motor, and that it was hoped finally to fire a number of these together in a cluster. Even a single unit needs large and extensive test facilities, as can be seen from the accompanying photograph of a Rocketdyne million-pound thrust test-stand.

Starting the rocket motor is the most ticklish part of a test. Before combustion is established the propellents come out with a great rush, and it is at this time that an explosion can occur if there is an undue delay in ignition. For this reason large missile rocket motors are nearly always tested vertically, the way in which they will be used in practice, as then the unburnt propellents can run out of the nozzle and the danger from explosion is lessened.

One of the test-stand designer's main problems is what to do with the stream of very hot gases leaving the nozzle. For a million-pound motor there will be 2 tons of them per *second* travelling at over a mile a second.

The usual solution is to deflect them into a horizontal path by means of a heavy steel plate. This requires very intensive cooling of the deflector plate, which is achieved by injecting huge quantities of water at the point where the gases strike the deflector.



The gigantic scale of this million pound thrust test-stand can be gauged by the stairway on the left. Photograph by courtesy of Rocketdyne.

Railway —and Weather Station

By Geoffrey N. Wright

RIBBLEHEAD station, 1,000 feet above sea-level, stands four-square to all the winds that blow, in the wild Pennine country of the West Riding of Yorkshire. It is on the main Leeds–Carlisle line, and although only a handful of passenger trains stop at the station, much freight and mineral traffic passes through it each day, as well as *The Thames–Clyde Express* and *The Waverley*, in each direction.

To be stationmaster there, apparently, you must have not only a sound background training in railway affairs, but must also be a meteorologist. For over 20 years Ribblehead has been one of many recognised weather-recording stations under the Meteorological Office. It has thermometers, rain gauges, and a wind-speed indicator, the dials of which are read in the station-master's office. Mr. Clark, the present stationmaster, records all the local weather information, and every hour he telephones R.A.F. Dishforth on a private Air Ministry line, using a special code of letters and numbers, to give full details about weather conditions at Ribblehead.

In order to measure cloud base heights, a hydrogen balloon is used. When I called on Mr. Clark recently, and asked if I could photograph him releasing this balloon, he was most obliging, and asked me to wait until he'd seen the northbound *Thames–Clyde* safely through about 4.00 p.m., after which he would send up the balloon. This is of pure rubber, and when wanted is inflated to a specified capacity with hydrogen from a cylinder, which is normally kept safely locked away. When so filled and then released, the balloon ascends, irrespective of wind or weather conditions, at the rate of 400 feet per minute.

At the moment of release, Mr. Clark operated a stop-watch, and then continued to observe the balloon ascending skywards, through binoculars, until it disappeared into the clouds. The stop-watch time was then noted, whence a simple calculation gave the height of the cloud-layer.

On this occasion, Mr. Clark had visually estimated the cloud-layer at 2,100 feet before he released the balloon. Its time of ascent, as measured by the stop-watch, was 5 minutes 10 seconds. Thus the layer was calculated to be at a height of 400 feet multiplied by $5\frac{1}{6}$, which give approximately 2,066 feet—this height, of course, being measured from the altitude of Ribblehead station.

Easiest Way Down

Chance Vought's Supersonic Escape Capsule

By John W. R. Taylor

THIS month's cover picture shows a formation of Chance Vought F8U-1 Crusader supersonic naval fighters from the U.S.S. *Midway*, over Mount Fujiyama, Japan. This kind of Crusader is not only designed to help keep the peace, but will soon play a major role in a "crusade" to protect the pilots of aircraft and space vehicles from the hazards that threaten their lives if anything goes wrong during flight at high altitudes.

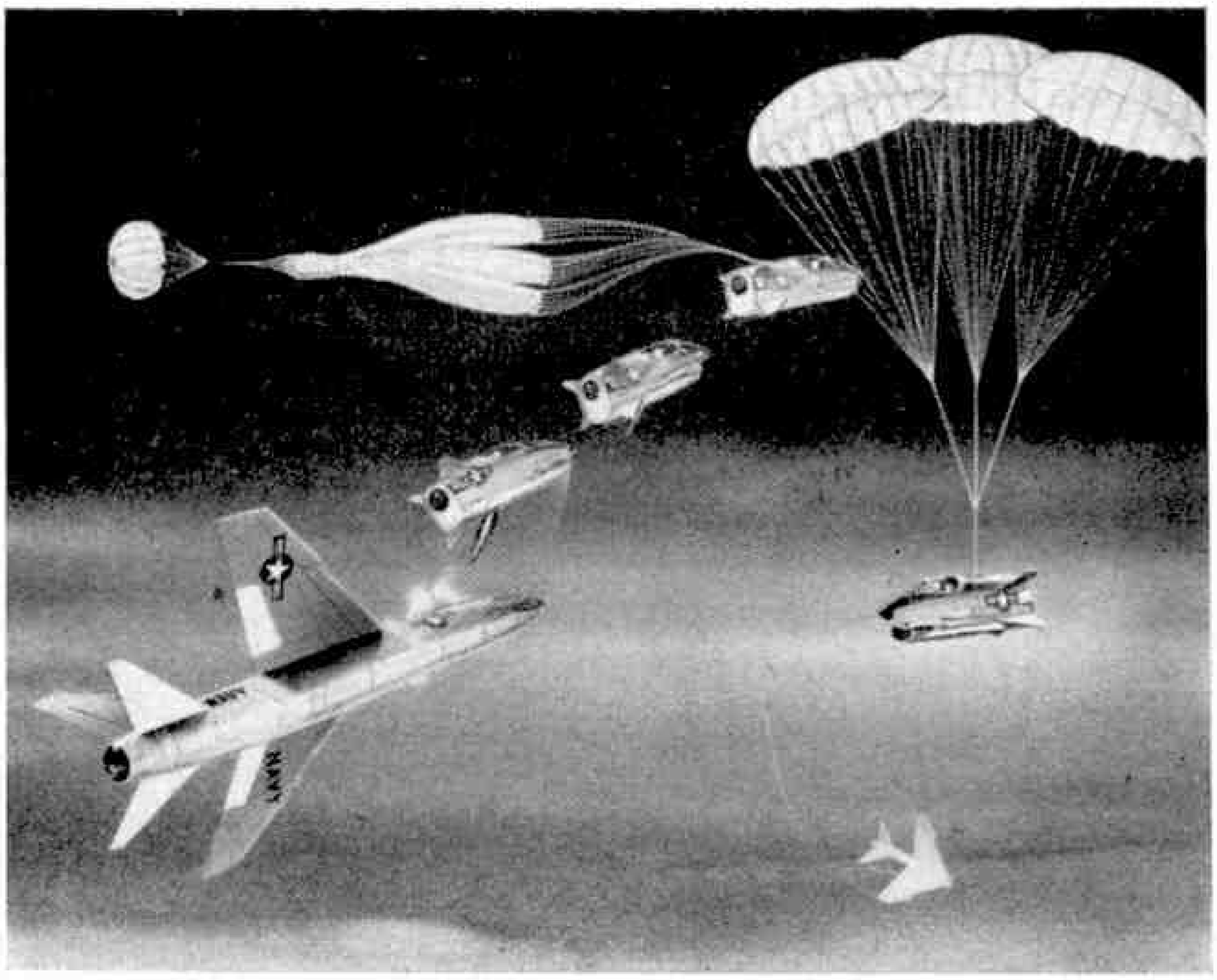
There have been cases of pilots surviving a normal ejection-seat bale-out at supersonic speed; but to make this possible airmen have to wear or carry an oxygen mask, pressure suit, parachute, oxygen bottle, life-jacket and raft or other equipment. The U.S. Navy asked Chance Vought to produce a scheme to get rid of much of this movement-restricting gear, so that pilots will be able to travel safely in shirtsleeve comfort. The result is a new-type escape capsule which will be tested on a Crusader before being built into other high-performance aircraft of the U.S. Navy.

As can be seen in the illustration, the capsule will consist of the entire nose of the fuselage, containing its own atmosphere and pilot protection systems. In the event of damage to the aircraft or serious trouble, the pilot will simply separate the capsule from the rest of the airframe and remain seated in the cockpit while the capsule is lowered gently by parachute.

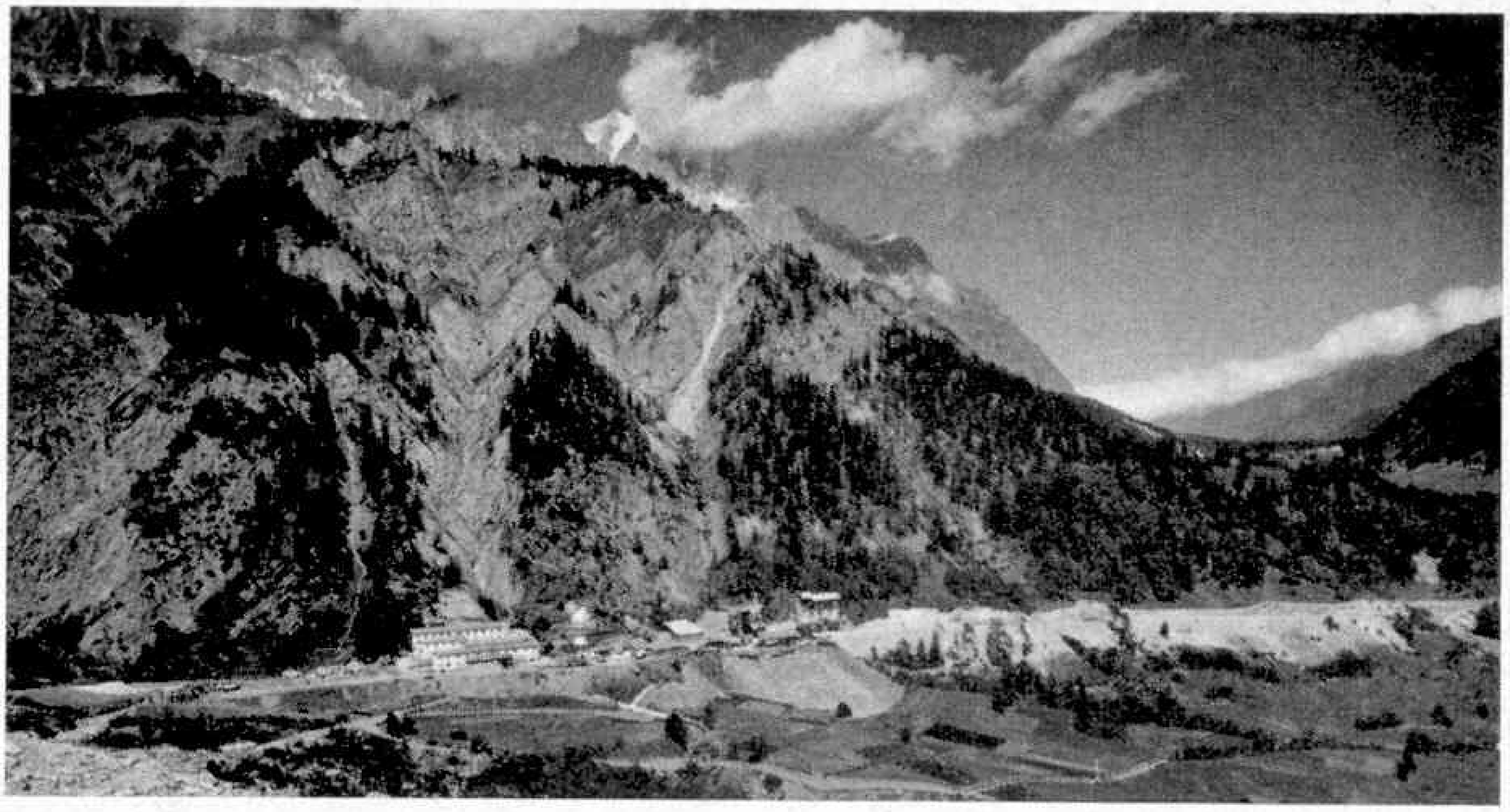
Separation of the capsule will be accomplished by a shaped-charge explosive system, which will slice through the structure attaching the nose to the centre fuselage. A rocket will then shoot the separated capsule clear. At the same time, retractable fins will flick out to stabilise the capsule and special drag-brakes will decelerate it.

At or below 62,000 ft. and approximately 500 m.p.h. a first-stage parachute will deploy. At 14,000 ft. and approximately 220 m.p.h. a second-stage cluster of 'chutes will open to handle the remainder of the descent. The capsule will float in water and provide protection on land or sea anywhere in the world. It will carry radio, flares and other communications equipment, as well as heating and rations.

The main job of the capsule will be to provide emergency escape up to any speed or height which aeroplanes can reach, offering protection against the wind-blast or supersonic speeds and the freezing cold and low pressure of high altitudes. But it will also permit escape with the aircraft still on the runway or even at a limited depth below the surface of the sea should a ditching occur during operations from aircraft carriers.



An artist's illustration of the sequence of events after the escape capsule, which forms the entire nose of the fuselage, has separated from the remainder of the aircraft.



Roadway through the Alps

The World's Longest Underground Motorway

THOUSANDS of feet beneath Mont Blanc, between Chamonix in France and Entreves in Italy, engineers are hollowing out a vast new tunnel to provide a much-needed road link between the two countries. The Mont Blanc Tunnel, named after the gigantic mountain mass under which it burrows, was begun in autumn of last year. When completed in 1961 it will be nearly seven and a quarter miles in length, and will be the longest underground motorway in the world. Just as a matter of comparison the Mersey Tunnel, which links Liverpool and the North with the Wirral and North Wales, and through which hundreds of readers must have travelled at one time or another, is only one and a half miles long.

The picture at the head of the page shows a panoramic view of a labour camp at the Italian entrance to a road tunnel 7¼ miles in length now being bored under Mont Blanc to connect France and Italy. Headings are being driven from both ends. For our illustrations and the information in this article we are indebted to the Societa Italiana Per Azioni Per Il Traforo Del Monte Bianco.

Completion of the Mont Blanc Tunnel will mean that at last it will be possible for road traffic to travel direct from France into the Aosta Valley, in Italy, all the year round, and this will certainly lead to a boom in tourist traffic between the two countries. The one and a half mile long Piccolo St. Bernard Pass, which is over 7,100 feet high and is at present the only pass between the Aosta Valley and France that can accommodate vehicles, is closed to traffic by snow for six months in every year.

Welcome as the Mont Blanc Tunnel may be to tourists, it will be of even greater value as a link for industrial traffic between the distant parts of Italy and the whole of Western Europe. The all-year-round road from Paris to Turin, for example, will be shortened by 138 miles and that from Paris to Rome by more than 194 miles, and passage from one country to the other will be considerably easier.

Since the tunnel will be high and wide enough to allow the passage of all but "special" road freight loads, it must be regarded as a new main thoroughfare. In terms of time it puts Chamonix, south of Lake Geneva, at less than half an hour from Italy, and Geneva itself at just over one hour.

The Italian and French companies who are handling the project will form one company to administrate the tunnel for seventy years, and then the tunnel will become the joint property of the two nations concerned. It is predicted that about 300,000 cars, coaches and lorries,

carrying somewhere in the region of 1,000,000 passengers and 80,000 tons of merchandise, will use it every year. In addition, about 49,000 motor-cycles are expected to pass through its length in the same period. It is believed that it will be able to handle 300 vehicles an hour in both directions, one-third of these being heavy vehicles travelling at an average speed of 15½ miles an hour. The regulation speed will be between 15 and 20 miles an hour, and no passing will be permitted. International road signs will be used.

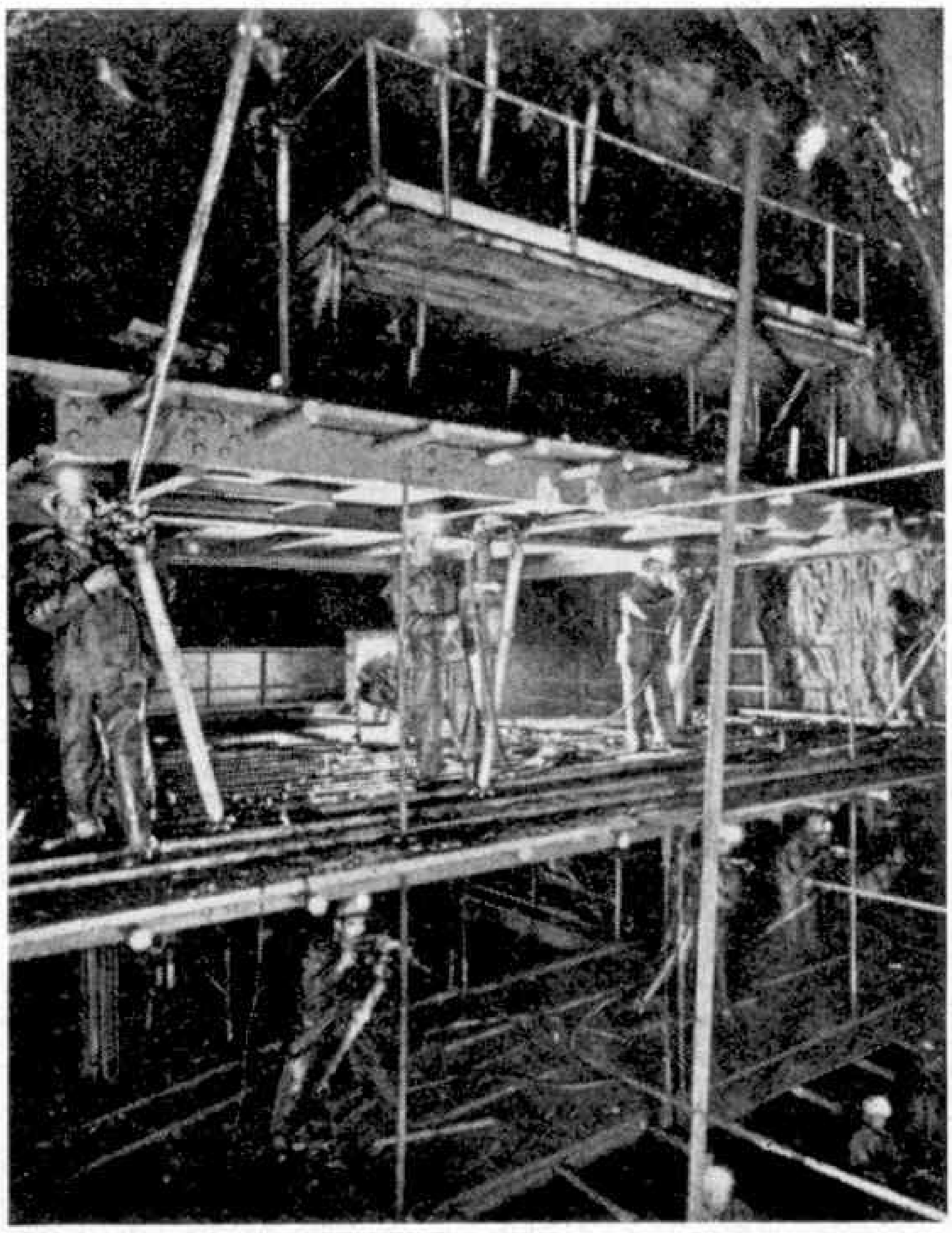
In a tunnel of this length special care must be taken to disperse the toxic gases given off by car and heavy vehicle engines, and a ventilation system has been designed that allows for automatic controls in independent sections along the tunnel's length. Carbon monoxide is the most lethal product and this will be diluted by the introduction of air equal to 4,000 times its own volume. About half of the air carrying the gas will be expelled through the tunnel outlets and the other half will be sucked in and expelled through ventilation conduits. To ensure comfortable driving conditions fine water sprays will reduce the temperature inside the tunnel from upwards of 45 deg. C. to about 25 deg. C.

There will be continuous lighting throughout the length of the tunnel, so that vehicles will not need to use their headlamps, and one useful feature is that the lighting will be toned down at the extremities of the tunnel to avoid the brusque change from daylight to artificial light. There are systems for control of traffic, signalling devices among them, at both outlets, and to provide for emergencies, telephones are spaced at frequent intervals throughout the length of the tunnel.

About four miles of the tunnel will be driven from the Italian side and about three from the French. The two teams that day and night are drilling their way closer and closer to each other will be about 8,200 feet below the ice-capped summit of the mountain when they meet near the centre. Regardless of the existing political frontier, the new boundary will be established midway along the tunnel.

The location of this subterranean link, the estimated cost of which is £11,700,000, was chosen by engineers and geologists because of the favourable conditions of the rock at the tunnel's mouth. There, it is in nearly vertical layers that are perpendicular to the direction of the tunnel itself. For the first few miles the rock is of a foliated nature, but throughout the greater part of the tunnel's length it is solid granite.

The two tunnelling crews started their tasks at a height of 4,171 feet above sea level on the French side and about 4,530 feet on the Italian side. The bore from the Italian side falls steadily at a gradient of 1 in 400 and that on the French side rises a little more steeply than this, and the two will meet at a height of 4,583 feet above sea level. The whole tunnel section measures about 96 square yards, and is in the shape of a horseshoe, but the area remaining free above the roadway will measure only 55 square yards, the remainder being taken up by the concrete lining and the section below the roadway, where the piping for the ventilation system will be placed.



The drilling Jumbo in use in the section of the tunnel now being bored from the Italian side.

Inside the tunnel in a section already bored and lined with concrete.

The roadway itself will be about 23 feet wide, and will be flanked by footpaths nearly 2 ft. 6 in. wide and just over six inches high. The vault above the roadway will be 19 feet 6 inches high, and the maximum width of the tunnel will be 30 feet. This involves excavating more than 1,300,000 cubic yards of rock and over 196,000 cubic yards of limestone.

The major part of the excavation will be accomplished by using 15 to 20 drills at the same time. Alternate patterns that cover the drilling programme on the Italian side have been planned to meet varying conditions and on both sides an average rate of progress of between 26 feet and 33 feet a day has been allowed for.

The drills in use on the Italian face are Atlas Copco Tiger rock drills mounted on pneumatic pusher legs. They are operated from a mobile four-storey carriage known as a Jumbo, which is shaped to cover the whole of the drilling area. It is shown in operation in the picture on page 13. At a central station close to the tunnel entrance there are four Atlas Copco AR4 compressors, with a combined output of 3,530 cubic feet a minute, that supply compressed air for each piece of pneumatic equipment in the tunnel.

There was one period some months ago when heavy flows of water brought the work to a standstill. The rate of flow reached a maximum of 77 gallons a second, but when it fell to about half this amount it was found possible to restart work. There is now a drainage system to pump water back through the tunnel mouth and into a convenient river that carries it away.

When the tunnel is completed there will be lay-bys every 900 feet or so, on the right and left alternately, to allow for parking in the case of breakdowns. They will be capable of accommodating the heaviest types of vehicles. Each will be 14 feet 9 inches in height, 9 feet 10 inches wide and 65 feet long. Provision has also been made for vehicles to turn round, if need be, at any lay-by, using alcoves built in the face of the tunnel opposite the lay-by in question. On the tunnel footpaths there are recesses about every 55 yards, and these are linked by telephone with the tunnel entrances.

Every possible precaution has been taken to guard against breakdowns and delays that could, perhaps, at such an altitude and under the particular conditions, occur oftener than in more nearly normal travel conditions. Much of the value of this fine tunnel could well be lost if such important safeguards were not seen to.

There will be stand-by equipment to provide reduced emergency lighting should the mains fail in any one section of the tunnel. Two pipelines underneath the road will carry new telephone and telegraphic links between Italy and France, and it is possible that cables and pipe systems for electricity and other services will also be installed when the tunnel is finally completed.

Living on a Railway Tunnel

By J. B. Ashby

AFTER reading the article in a recent issue of the *Meccano Magazine* about a railway station built on a bridge, I was reminded of something even more extraordinary—a house on the entrance to a railway tunnel.

The house is built above the North entrance to Clayton Tunnel, which is a few miles north of Brighton on the main London–Brighton line. It now belongs to British Railways, but was built in the days of the former London, Brighton and South Coast Railway. It was originally a pay office for the labour force constructing the tunnel, and at one time the chief ganger of the tunnel maintenance gang used to live there. After being empty for some years, it is again occupied, this time by a Southern Region passenger guard, his wife and two children.

The house consists of four main rooms, two bedrooms, a kitchen and living room. There is no bathroom because of the problem of surplus water getting into the tunnel. There is a safety fence at the rear of the house and this fence has a padlocked gate so that the children cannot be in any danger of straying over the tunnel edge.

The good lady of the house let me have a look round. The little house was spotlessly clean; even the windows did not appear to get dirty, in spite of the passage of trains below. On the mirror in the living room was a list of the trains on which her husband was working that day, and as the train came into the tunnel or went out of it, his small daughter would wave to her father from the window.

Nowadays, of course, most of the trains are electric and there is very little noise when a train passes through and the vibration is scarcely discernible. In the summer there are of course more steam trains and specials running to Brighton through the tunnel. There is, however, rather more noise when gangs are at work in the tunnel.

The occupants have lived there for several years and like being there very much. There is a pleasant little garden at the rear of the house, which is shown in the picture above. The look out over the track is to the right.

At the time of my visit the occupier's son was having a bedroom built in one of the towers, with access through a loft ladder in the kitchen.

The Canadair Forty-Four long-range, four-engine, turboprop transport. It is the largest aircraft ever built in Canada.

Air News

By John W. R. Taylor

1960—Aviation's Most Exciting Year

This promises to be one of the most exciting years in aviation history. Over in America the North American *X-15* rocket-plane is expected to reach speeds of up to 4,000 m.p.h. and a height of 100 miles during 1960, while the seven Project Mercury space-men will have a foretaste of what it will be like travelling in a satellite when they are fired down the Atlantic rocket range in containers on the nose of Redstone missiles.

In Britain we shall have the first flights of the Bristol T.188 research aircraft, designed to fly at up to 2,000 m.p.h., and the Handley Page H.P.115, the slow-speed "flying model" of our first supersonic airliner. And we can certainly count on more surprises from Russia.

During the past year, Soviet airmen have been capturing one aviation record after another. Following confirmation of Vladimir Ilyushin's world height record of 94,658 ft. on 14th July last, comes the claim that G. Mosolov has broken the world speed record at an average of 1,483·8 m.p.h., reaching no less than 1,556 m.p.h. on one of his two runs. Both records were held previously by Lockheed F-104A Starfighters of the U.S.A.F., which clocked 1,404·19 m.p.h. and 91,249 ft. in May 1958.

The Russians have not released any photographs of the new record-holders. All we know is that they are single-engined jet aircraft, and that the height record machine is designated T-431 and has a 19,840 lb. thrust turbojet. It seems possible that they are members of the family of delta-wing fighters designed by Pavel Sukhoi and which are now reported to be in squadron service.

Other equally impressive new Russian records include a climb to 67,112 ft. with a payload of one ton by V. Smirnov in an aircraft designated RV, with two 8,820 lb. thrust Type 37V turbojets on 13th July last; and a climb of 20,800 ft. with an 11,023 lb. payload by Brovtsev and Chichov in the giant Mi-6 helicopter last April. The Mi-6 also lifted nearly ten tons to 18,536 ft.

Canadair's Super-Britannia

The Canadair Forty-Four long-range transport, illustrated on this page, is the largest aeroplane ever built in Canada and has an interesting history.

Back in 1954, Canadair acquired from Bristol the licence to build a much-modified version of the Britannia for anti-submarine duties with the R.C.A.F. The result was the CL-28 Argus, which has the wings, tail, undercarriage and controls of the airliner, but a completely new fuselage and four 3,700 h.p. Wright Turbo Compound piston-engines which are more suitable than turboprops for long flights at low altitude.

Having got the Argus in production, Canadair decided to see if there was a market for a transport version. The R.C.A.F. said it would buy twelve, so the company redesigned the Britannia with a 12 ft. longer fuselage and four 5,730 h.p. Rolls-Royce Tyne RTy.12 turboprops, designating the new machine the CL-44 or Canadair Forty-Four.

The greater roominess and power enable the CL-44 to carry up to 184 passengers or more than 29 tons of freight. A version known as the CL-44D is also being built, with the entire tail hinged so that it can be swung to one side for end-loading of vehicles and bulky freight. Ten of these swing-tail models have been ordered by the Flying Tiger Line and five by Seaboard & Western Airlines, and the first is due to fly this summer. It will have a loaded weight of 205,000 lb. and maximum range of 6,330 miles at 374 m.p.h., with reduced payload.

Martin out of Aeroplane Business

A sign of the times is that the famous American Martin Company is virtually out of the aeroplane business now that it has completed its last B-57 Canberra bombers and P5M Marlin and P6M SeaMaster flying boats. In future, it will concentrate on missiles, space-craft, nuclear and electronic developments.

Much the same thing is happening in Britain. It is years since Boulton Paul designed an aeroplane of their own. Gloster appear to have nothing to follow the Javelin; Supermarine's design office is being combined with that of the parent Vickers company; Scottish Aviation have announced no successor to the Twin Pioneer; and there may be no more individual Saunders-Roe and Folland projects now that these companies have been taken over by Westland and Hawker Siddeley respectively. In addition, Vickers and English Electric are working together on the R.A.F.'s new TSR-2 reconnaissance-bomber; while de Havilland,

Mark Horn and "Li'l Trouble", the single-seat lightplane which he designed and built.

Fairey and Hunting are working as a team to design and build the D.H.121 jet airliner for B.E.A.

Horn's Home-Built Aeroplane

One of the sportiest-looking single-seat lightplanes flying in America is *Li'l Trouble*, illustrated above. It was designed by Mark Horn, who runs the Everglades Flying Service in Florida and, like many other "home-builts", has a mixed parentage. For example, it has cut-down Monocoupe wings, the cockpit section of an Aeronca Defender and Piper Cub undercarriage, with Taylorcraft wheels and brakes. The engine is a 100 h.p. Continental flat-four.

Li'l Trouble flew for the first time in May 1957. To prove its structural strength Mr. Horn later put it into a 250 m.p.h. dive and pulled it out so sharply that it was subjected to a load of 8·9g (nearly nine times the pull of gravity). Its normal cruising speed is 145-165 m.p.h. Wing span is only 17 ft. 10½ in., and the loaded weight 1,000 lb. The best tribute to its handling qualities is that it is so designed that the rear fuel tank can be taken out to make room for a seat and dual controls for training small children to fly.

Record Year for Rescues

The best summer for many years, in 1959, gave R.A.F. Coastal Command's search and rescue organisation its busiest season ever. Whirlwind and Sycamore helicopters of Nos. 22 and 228 Squadrons, deployed around Britain either on or near the coast, dealt with 241 rescue incidents between 1st January and the official end of summer on 21st September. Of this total, 173 involved boating, bathing and other close-to-shore mishaps to civilians, of whom 35 were either rescued from the sea or assisted to safety from precarious positions on the shore. In addition, there were 44 cases of seriously-ill or injured civilians being flown to hospital in various parts of the country.

Flying Crane's "People Pod"

During a five-week demonstration tour of military centres, the Sikorsky S-60 flying crane helicopter carried many senior officers and troops in an experimental 20-passenger "people pod", slung under its fuselage boom. Although this may not look very luxurious in the bottom illustration on this page, it is surprisingly comfortable, being suspended from the boom by rubber shock-absorbers which eliminate the usual vibration.

Normally the S-60 hauls cargo at the end of a cable or in a net under its fuselage; but the big advantage of a flying crane helicopter is that the size and shape of a load are quite unimportant provided it is not too heavy to lift. On this particular tour, the S-60 lifted cement mixers, lorries, guided missiles and a water tank, and towed a 15½-ton bulldozer, in addition to carrying the "people pod".

Hustling at Ground Level

A Convair B-58 Hustler delta-wing bomber hedge-hopped across four western States in America recently, flying at 700 m.p.h. less than 500 ft. above the ground, to show how it can sneak in under the radar defences to strike at vital enemy bases. Cameramen and observers stationed along the 1,400-mile route said afterwards that by the time they heard the sound of the Hustler's four J79 turbojets and sighted it in the air, it was nearly out of sight going away. This is hardly surprising, because its speed was greater than that of a revolver bullet.

Music in the Air

As an experiment, K.L.M. are playing gramophone records over the public address system of their DC-7C long-range airliners. At present the music is being broadcast only during embarkation, disembarkation, cocktail time and, if requested, during dinner. If passengers approve of this form of entertainment, they may eventually be given individual headphones, so that they can listen in whenever they like.

A demonstration of how quickly troops can disembark from the experimental 20-passenger "people pod" slung under the fuselage boom of a Sikorsky S-60 flying crane helicopter.

The up "Cambrian Coast Express" stands at Paddington in charge of 4-6-0 No. 6010 "King Charles I," after one of the journeys described in the accompanying notes. Photograph by R. F. Roberts.

Railway Notes

By R. A. H. Weight

Aboard the "Cambrian Coast Express"

One portion of this train starts from Pwllheli, in a north-western coastal corner of Wales, and travels mainly southward by the sea with splendid marine and mountain views through romantically situated beauty spots such as Criccieth, Harlech, Barmouth, Aberdovey. It passes near to the inward termini of the narrow gauge Festiniog and Talyllyn narrow gauge railways. The restaurant-car portion from Aberystwyth on Cardigan Bay is attached at Dovey Junction. The combined train now proceeds eastward, still for many miles on single track along what was once the main line of the Cambrian Railways, now W.R., through grand inland scenery with some steep climbs. I described this attractive part of the journey in my article *Wide and Narrow Gauge in Wales*, published in the April 1957 *M.M.*

At Shrewsbury, on the W.R. north main line reversal is necessary in the large and busy joint station. Our standard class 4 4–6–0 went off there and another coach was attached, while at the other end Castle 4–6–0 No. 5060, *Earl of Berkeley*, came on to work through to Paddington as part of the long London-Shrewsbury-and-back regular duty for engines and men stationed at Old Oak Common. We had "8-on", a full train weighing 285–290 tons gross. After a long pull up on each side of Wellington (Salop) to Hollinswood Tunnel, a maximum of 82 m.p.h. was attained down the subsequent descent near Cosford and the express was punctual at Wolverhampton, and also at Snow Hill, Birmingham, where many passengers changed and joined. In complete contrast we had by then for 15 miles been traversing busy multiple-track lines and networks, amid great industries.

When my run was made last summer this was the fastest Shrewsbury-Birmingham-Paddington train with a rather too-tight schedule over the 23¼ miles between the Snow Hill and Leamington stops; there was also an extra slack.

We were four minutes late away from Leamington Spa, into open country again, and travelled over the undulating 87¼ miles to Paddington in just over 96 min., although there was a signal slowing approaching the fine new station at Banbury, and a track-renewal one just where the last high speed could have been reached approaching the suburbs near Denham. Maxima were 75–76 m.p.h., with final arrival just after 6.5 p.m. instead of 6.0.

With the same load a keen crew on the more powerful 4-cyl. 4–6–0, No. 6010, *King Charles I*, ran into Paddington 1½ min. early on the occasion when the accompanying photograph of this train was taken. It had taken less than 2 hrs. from Birmingham, having maintained a mile-a-minute average from Leamington, where the start was 6½ min. late as water was taken there on account of intermediate track troughs being out of action. With speeds up to 80–91 m.p.h. all lost time was recovered before Princes Risborough. After the usual cautious passage of the High Wycombe area there were some signal slowings, though again recovery was rapid.

Locomotive and Traction News

Construction of the powerful and now widespread class 9 steam 2–10–0s has continued at Swindon. Nos. 92211–5 lately added to stock are for W.R. service, as are Nos. D 809–11, respectively named *Champion*, *Cockade* and *Daring* in the diesel-hydraulic B-B express series.

Rapidly completed 2,000 h.p. main line English Electric type diesel-electric locomotives numbered D 210–36 have been allocated to principal L.M. depots, together with 2,300 h.p. B.R. 1 Co-Co 1 Nos. D 2–5. The first N.E.R. English Electric examples reported at Gateshead Shed are Nos. D 237–8.

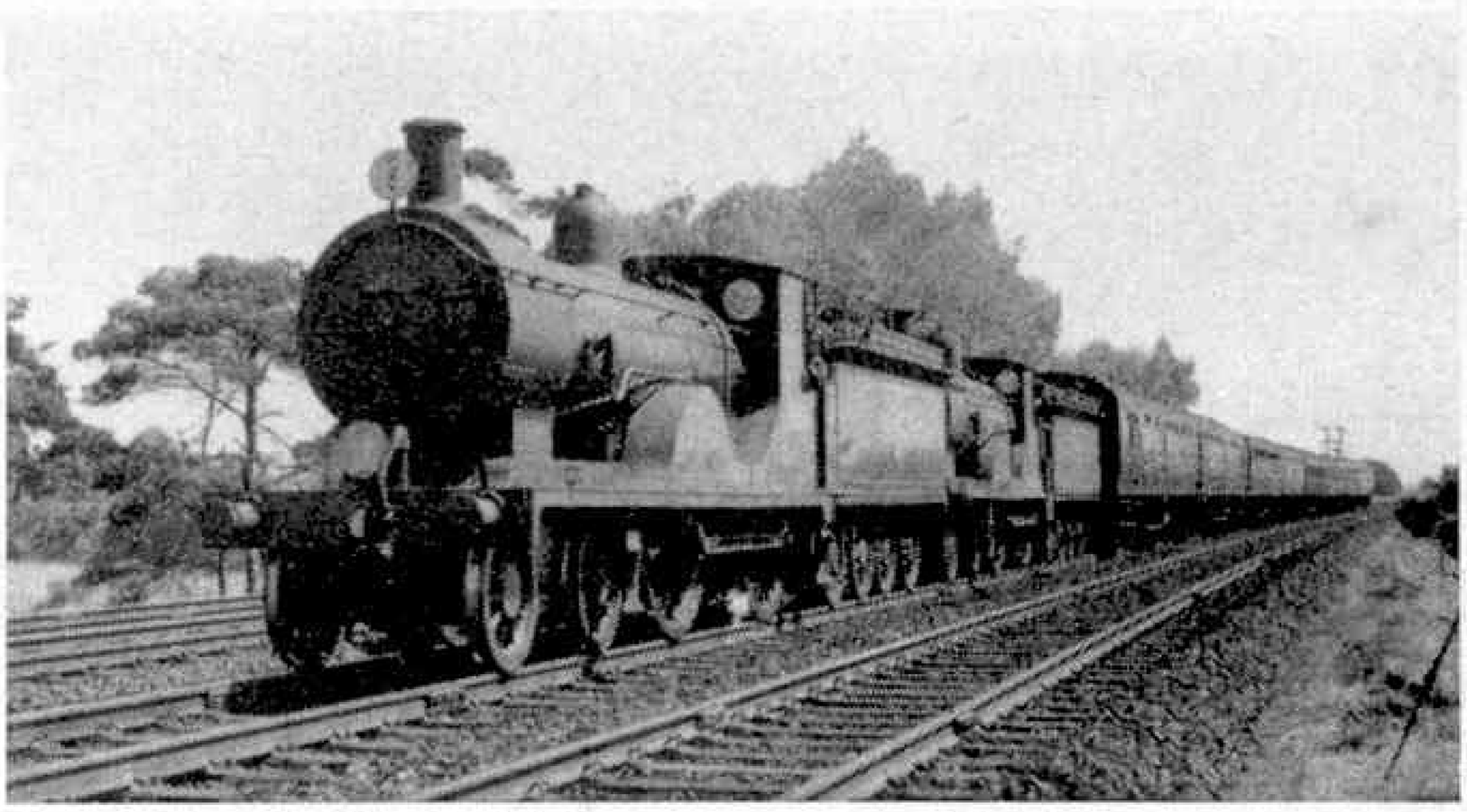
In the lesser-powered type 2 groups, most of the Brush A 1 A-A 1 A units numbered D 5538–55 are stationed at Ipswich, now an important diesel depot. Nos. D 5032–41 and upward, and D 6122–5 have also joined the G.E. Line fleet lately, Nos. D 5336–9 having gone to the Scottish Region. Others are coming into service, with more shunting or local units too.

Considerable diesel locomotive orders are in hand at Crewe, Doncaster and Swindon Works. Six of a new design for the S.R. will operate as electric engines, taking current normally from the third rail and from diesel-driven generator on non-electrified lines. There are to be 74 powerful 2,700 h.p. diesel-hydraulic main line locomotives in this revised series for W.R. express passenger, freight and other duties.

Nos. S 68001–2, the first S.R. motored bogie luggage vans, can form part of multiple unit electric Continental boat expresses, with one or other of their driving cabs used for controlling the whole train if necessary. They can also move under their own power, changing over to batteries for the purpose, along unelectrified lines on the quays at Dover, for instance, or be employed for hauling light trains.

British Railway Shops are to turn out 390 passenger vehicles to be formed into multiple unit diesel sets for service in various areas, including Liverpool-Manchester, on the former Great Central routes from Marylebone, Leicester-Nottingham and in Scotland and North Wales.

Inter-city express 6-coach diesel trains including buffet cars are to be introduced between Hull and Liverpool. Some are running on the Glasgow-Girvan, Ayrshire, services. Diesel-electric 3-car sets are to be built at Eastleigh, when present commitments are completed, for the London-Oxted-East Grinstead, etc. service, now steam. They will be capable, as usual, of being coupled when greater accommodation is needed.



The pair of ex-L.S.W.R. T9 4-4-0s seen here were working their passage on transfer to the West Country when caught by the camera of S. C. Nash.

Timetable Changes

Many variations found in the L.M.R. current winter service include retiming and acceleration of the *Royal* and *Mid-day Scots*, now limited trains with all seats reservable. The *Caledonian* carries more and has been slowed to a 7¼-hr. London-Glasgow overall schedule, as applied to the other two day expresses each way. As there are few Euston-Birmingham line trains, Coventry passengers are provided for by diesel connections to and from Rugby. The Paddington-Birmingham-Wolverhampton fast service has been augmented and altered to make up for the deficiency, largely on an hourly basis with extras at busy times. A new 2-hr. Paddington-Birmingham express starts at 8.30 a.m., with similar return ones at 2.0 and 4.45 p.m. from Snow Hill. A few Manchester-Euston fast trains have been diverted to St. Pancras, in order to relieve the route via Nuneaton and Rugby.

The *Bristolian* has reverted to the 1¾-hr. timing each way, as last winter and for some time previously, averaging over 67 m.p.h. An additional 10 min. overall allowance on account of structural or electrification work has been given to the *Broadsman* and all other principal steam or diesel hauled services between Liverpool Street and Norwich and East Anglian and north Essex coast towns.

Recast and greatly improved services with diesel trains on the Midland line have been introduced, or will soon be in full operation, between St. Pancras and Bedford and Sheffield and Nottingham. A number of improved facilities introduced during the past year or so are being continued with steam, electric or diesel traction.

From my Summer Notebook: Southern

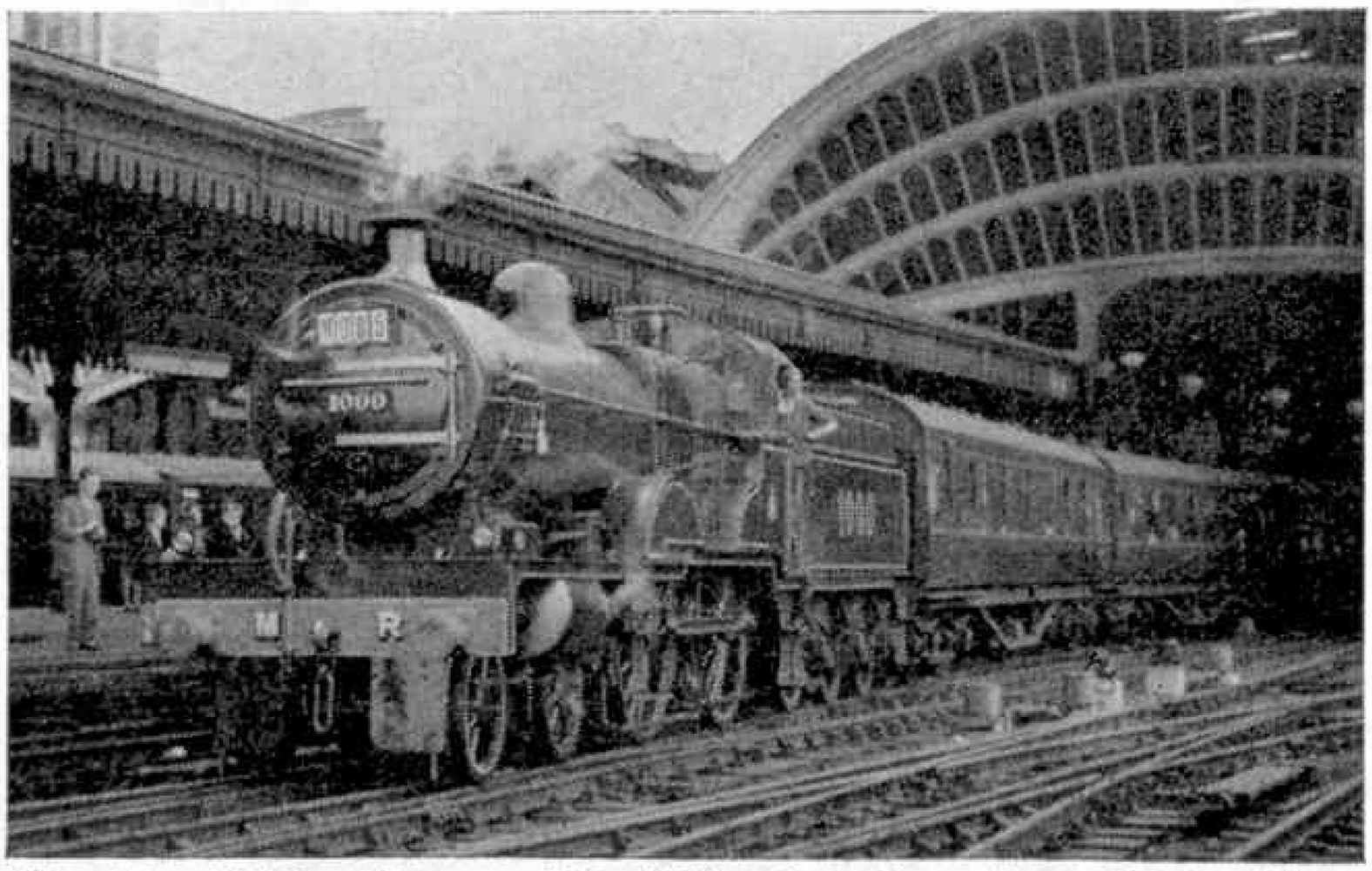
Survivors of the last partially existing class of London and South Western Railway 4–4–0s, the T9 rebuilds, were taking a few fast passenger and other trains west of Exeter as well as in the Hampshire area, though no longer stationed in the London district. Some of them have made their last journeys to Ashford Works to join the rather melancholy lines of ex-London, Brighton and South Coast tanks and South Eastern and Chatham tender and tank engines awaiting breaking up after long service, extending in some cases to 40–50 years or more.

On a busy August Saturday at Tonbridge double-junction I noted the following locomotives on Kent Coast trains to and from London, ordinary and extra, boat expresses or general town ones. 14 light Pacifics, including 7 Rebuilt West Countries; two examples of type 2 diesel locomotives working in tandem, one being a down relief, Victoria-Dover, Marine, ahead of the *Golden Arrow* and the other the 12-coach through train from Birkenhead taken over at Redhill, whence a very fast run had been made; 4 Schools 4–4–0s; a class 5 standard 4–6–0; and some N and U1 2–6–0s.

Engines of stopping or local trains included representatives of class L 4–4–0, H 0–4–4T; Q1 or C 0–6–0; U1 2–6–0 and B.R. class 4 2–6–4T. London-Hastings diesel-electric sets were numerous, a few being employed also to form London-Kent coast trains as usual at week-ends.

Another day the *Golden Arrow* was worked by No. 34092 *City of Wells* from Victoria to Folkestone Junction, returning from Dover. The up *Man of Kent* Ramsgate - Dover - Charing Cross express fast from Folkestone, Central, to Waterloo, Eastern, passed Ashford at speed. The heavy train was an impressive all-green one behind No. 30927 *Clifton*, of the Schools class.

Locomotives used in stages along the coast to or from Brighton, Eastbourne, Hastings, on through Midlands, etc. trains ranged from West Countries to ex-L.B.S.C.R. K. 2–6–0 and E4 0–6–2T classes, including N class Moguls and 2–6–4 tanks.



The restored Midland Compound No. 1000 makes a brave show at York with an enthusiasts' special. Photograph by J. F. Henton.

Aeroflot—The World's Biggest Airline

By John W. R. Taylor

AEROFLOT, the national airline of the Soviet Union, is the largest airline in the world. Precise details of its equipment and operations are never issued; but a Russian newspaper reported last April that 2,585 services were then being flown each week. Visiting British pressmen have been given figures varying from ten million to fifteen million for the total number of passengers carried each year. And semi-official estimates of the Aeroflot fleet give it a strength of around 150 Tu-104 jet-liners, 40 Il-18s and a rather smaller number of An-10 turboprop airliners, 1,500 twin-engined transports—mostly Il-12 and 14 and Li-2 (Dakota) piston-engined machines —and about 2,000 smaller types, including helicopters.

These are staggering statistics, but it must be remembered that Aeroflot is the only airline in the whole vast territories of the U.S.S.R. and is responsible for all kinds of jobs such as ambulance flights and agricultural crop-spraying, as well as scheduled services. It cannot therefore be compared with any single airline in the West.

The picture at the head of the page shows one of Aeroflot's first jet-liners, the Tupolev Tu-104, which went into regular service in September 1956.

The usual method of putting its operations into perspective is to compare them with the figures for all U.S. airlines added together. We then find that in 1958 American operators, with a combined fleet of 1,717 aircraft, carried more than 52 million passengers, or three to five times the Russian total.

However, statistics by themselves are misleading. The only real way of assessing the quality of an airline is by the service it gives to the community, and by how it plans to improve that service in the years ahead. This way gives a very different picture, because Aeroflot offers its passengers jet and turboprop travel over more routes than any other airline in the world. And its activities are growing at such tremendous speed that passenger air traffic alone is expected to increase almost six-fold in the next six years, during which it is also planned to build or modernise more than 90 airports.

Such a programme will cost a vast amount of money, but the Soviet leaders realise that highly-efficient transportation is essential for the continued economic and industrial progress of their country. To build and maintain tens of thousands of miles of modern roads in remote areas would cost even more; so aviation will be used instead, to open up undeveloped regions and link closely together every part of the Soviet Union.

This makes good sense, because the more people fly the more aeroplanes will be needed to carry them. This will give work to an increasing number of people and create a thriving aircraft industry. In fact the whole thing becomes the opposite, a benevolent spiral in contrast to a vicious one, because increased traffic usually makes possible lower fares, so that still more people can afford to fly, requiring still more aeroplanes . . . and so on.

In view of all this, it is far better to

compare Aeroflot's present operations with those of a few years back, rather than to match them against Western statistics. In mid-1956 its fleet was made up largely of Ilyushin Il-12 and 14 and Li-2 (Dakota) piston-engined aircraft. The best of these, the Il-14M, is in much the same class as the early American Convair-Liner, with seats for 24 passengers and two 1,900 h.p. ASh-82T engines which give it a range of 930 miles at 200 m.p.h. It is sturdy and reliable, and remains in widespread use; but a revolution in Soviet air travel began in 1956.

By-passing completely the four-piston-engined stage, Aeroflot jumped straight to jet travel with the Tupolev Tu-104, which entered regular service on 15th September that year. Except for B.O.A.C.'s brief period of pioneering with the Comet 1 in 1952-54, this marked the beginning of regular airline jet operations, and it was to be two more years before any other airline could offer its customers the comfort and speed of jet transportation.

To save time and make use of an already-proven design, the Tu-104 was basically a Tu-16 bomber fitted with a new and larger cabin for 50 passengers. Its performance was good, with a range of 2,000 miles at 515 m.p.h., and although its modest cabin pressurisation prevented it from flying so high as the later Comet and Boeing 707, it soon proved itself a popular and efficient airliner.

It has since been joined by several other types. First came the Tu-104A, with 70 seats and improved RD-3M turbojets rated at 20,950 lb. thrust each compared with the 14,850 lb. of the Tu-104's engines, and the Tu-104B with 100 seats in a slightly longer fuselage.

Tu-104As were used on Aeroflot's services to Britain in 1959, until the new turboprop Ilyushin Il-18 was put on the route on 14th October. This aircraft bears comparison in every way with its Western counterparts, the Lockheed Electra and Vickers Vanguard. It is usually fitted out to carry 80 passengers, and the four 4,000 h.p. Ivchenko AI-20 turboprops give it a cruising speed of 370-385 m.p.h. In much the same class, and with the same engines, is the Antonov An-10A Ukraine which has been in service on Russia's internal routes since July 1959 and is capable of operating from quite small grass or concrete runways with a full load.

Biggest of the present generation of Soviet airliners — in fact the largest transport aircraft ever flown — is the Tupolev Tu-114, which was demonstrated at the Paris Air Show last June and was used later to carry Mr. Khrushchev and his party on their American visit. Based on the Tu-20 bomber, and powered by four 12,000 h.p. Kuznetsov NK-12M turboprops, this 185-ton giant can fly non-stop from Moscow to New York, Delhi, Peking, Rangoon or Tokyo in 10-12 hrs., carrying 120 passengers at 440-500 m.p.h. Standard seating is for 170 persons, with a restaurant, served from below-deck kitchens, and four sleeping compartments. In tourist form it will seat 220 persons, and Aeroflot expects that each of these aircraft will be able to carry 50,000 passengers a year on international services, which is equivalent to the work done by a 40,000-ton ocean liner.

With such aircraft entering service, there is little reason to doubt that Aeroflot will reach the incredible target set it under the current Soviet seven-year plan. Already more people travel by air from some Soviet

Ilyushin Il-18 turboprop airliner, which Aeroflot introduced in April 1959. Photograph by S. Preobrazhensky.

The huge Tupolev Tu-114 was seen in public for the first time at the Paris Aero Show last year. Photograph by John W. R. Taylor.

cities than by rail. On the Moscow-Khabarovsk route, for example, air passengers outnumbered rail passengers almost two to one last year. This is understandable when we discover that a flight from Moscow to Leningrad costs less than a first-class sleeper ticket on the railway, and that children are carried free. Furthermore, rail journeys often take a long time in such an immense country, or collection of countries, and there can be few people who would not prefer a 9-10 hr. flight from Moscow to Vladivostok in a Tu-114 to the journey of eight or nine days by train.

Some aspects of Russian air travel still seem strange to Western eyes. For instance, it is surprising to enter a jet airliner like the Tu-104 and find that the furnishings include glass cases containing porcelain figures, lace mats on the tables and hand-embroidered curtains between the cabins. Yet, might it not be that we have lost our sense of values if we prefer cold mass-produced plastics and arty-crafty wallpapers to beautiful objects handmade by craftsmen?

Technically, progress is being made at a spanking pace, and Russia is buying and testing radio and radar equipment such as the British Decca Navigator to improve further the safety and all-weather regularity of its air services. This is important, for the daily sight of Soviet airliners flying over Britain, and of Western aircraft on the Moscow airports of Vnukovo, Bykovo and Sheremetyevo is the best possible proof that the old barriers of suspicion and misunderstanding between East and West are giving way to a new and happier era of friendly trade and travel, which must help to bring peace to the world.

HOME PHOTOGRAPHY

By A. R. Pippard, B.Sc. and Kevin MacDonnell

The introduction to this booklet, published by the well-known firm of Johnsons of Hendon, states that photography is such a vast subject that it cannot be covered completely in a volume of this size. This of course is true, but no amateur interested in the hobby, and many indeed who are more artistically and even professionally involved in it, will not have much to complain about in this respect as far as the booklet is concerned, for in its 104 pages there is a remarkable wealth of information and guidance. It covers indeed every aspect of the subject, from box camera work to the more intricate problems of development, printing, etc. and even colour photography, including processing.

For the average amateur there is invaluable guidance in picture planning, exposures, development and printing, both contact and enlargement, and with it interesting and helpful explanation of the principles behind the various operations. So it is useful alike to those who are content with making exposures and having their films treated by others, and to those who take up the hobby more seriously with the aim of producing really good and attractive pictures.

What can be done in this respect is well illustrated by the very large number of illustrations of all kinds, showing good pictures that illustrate the general principles of composition, and others that indicate how to avoid failures. The booklet is definitely one that will enable the home photographer to produce better pictures and to have some splendid times enlarging his own knowledge and experience of photography generally. Its price is 3/–, and it is obtainable from booksellers and photographic dealers.

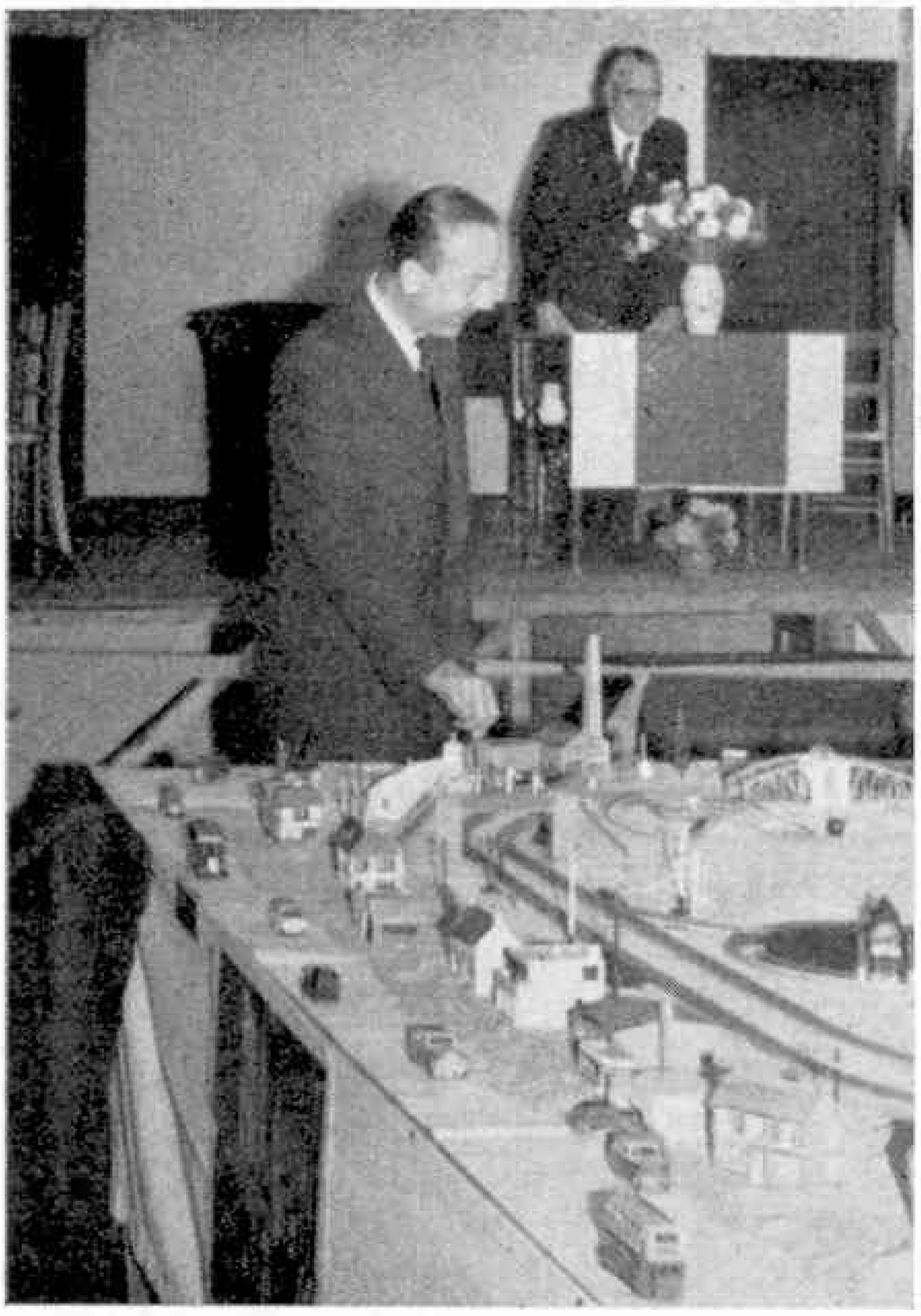
Incidentally, Johnsons have produced a very useful gadget for removing obstinate screw caps from bottles, no doubt with an eye on the needs of photographers. But it is not only photographers who encounter difficulties of this kind, and their bottle-screw-cap remover is something that should be in every home. It is a shaped rubber grip, and the reviewer can testify to its efficiency, as he has tried it for himself. It is sold by all chemists and photographic dealers at the modest price of 9d.

TALYLLYN RAILWAY CALENDAR 1960

Once again the Talyllyn Railway Company have produced an attractive calendar for railway enthusiasts. Measuring 11½ inches by 8¾ inches, it is printed on art paper and includes six large photographic reproductions of scenes along that famous line, there being two months to a sheet.

The price of the calendar is 2/6 post free and copies can be obtained from Mr. R. K. Cope, "Brynglas," Beckman Road, Pedmore, Stourbridge, Worcestershire.

MECCANO MAGAZINE



Junior Section

EVERY year near Christmas the Wembley Research Laboratories of the General Electric Co. Ltd. become a scene of feverish activity. The reason for this is that preparations have to be made for a Children's Party there, when about 1,300 boys and girls go all out to enjoy a whoopee Saturday afternoon. For them there have been coal mines with cages that do everything but go up and down, space trips in a rocket that actually had to make a crash landing, jet flights and . . . the Railway Club's layout.

When the first of the layouts was being planned, all wondered if the idea would go down well. Afterwards the battered operators agreed that crash barriers would just have to be installed for next year's Party, so there was no doubt whatever of the popularity of this item.

The layout used has been a very large one every year since the first in January 1957, and in a future issue of the *M.M.* there will be some details that are sure to provide splendid examples of the way to do things when planning a Hornby-Dublo railway, for of course the layout was entirely Hornby-Dublo in make-up. A small section of it, with Dinky Toys on the roadways that form part of it, is seen in the upper picture on this page. In this the display is being officially opened by switching on current to set one of the trains off on a run round the track.

A fine Dinky Toys display in California. Its owner is Nigel Taylor, of Glendale, in that State.

"Spanner's" Special Section for Juniors

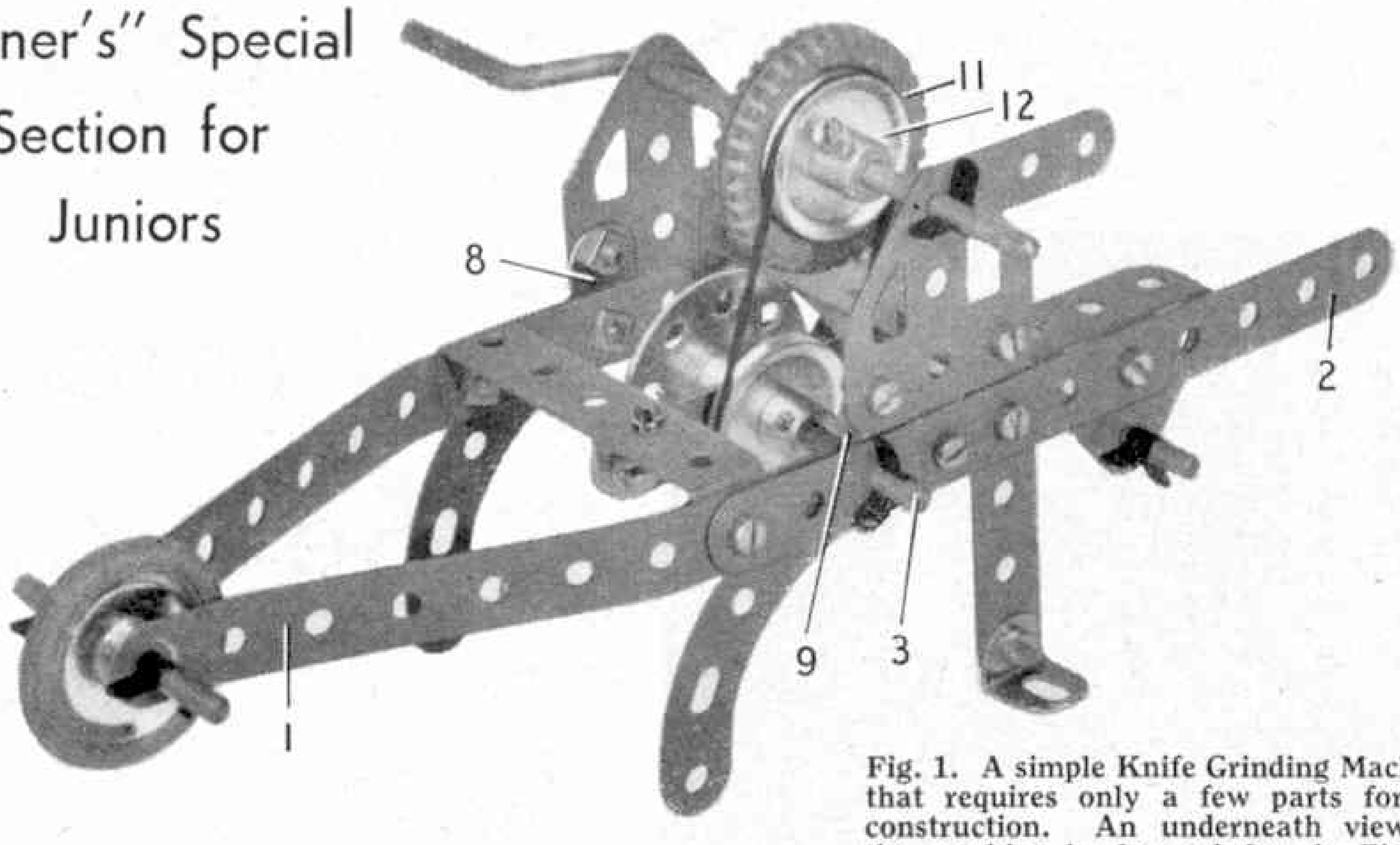


Fig. 1. A simple Knife Grinding Machine that requires only a few parts for its construction. An underneath view of the machine is shown below in Fig. 2.

Easy Model-Building

Knife Grinding Machine

Each side of the cart consists of two $5\frac{1}{2}''$ Strips 1 and 2, overlapped four holes and bolted together. Strip 1 is curved as shown to provide the bearing for the $2''$ Rod that forms the axle. The $2''$ Rod carries a $1''$ loose Pulley with Rubber Ring forming the road wheel of the cart. Washers, placed two on each side of the $1''$ Pulley, space the Pulley from the $5\frac{1}{2}''$ Strips.

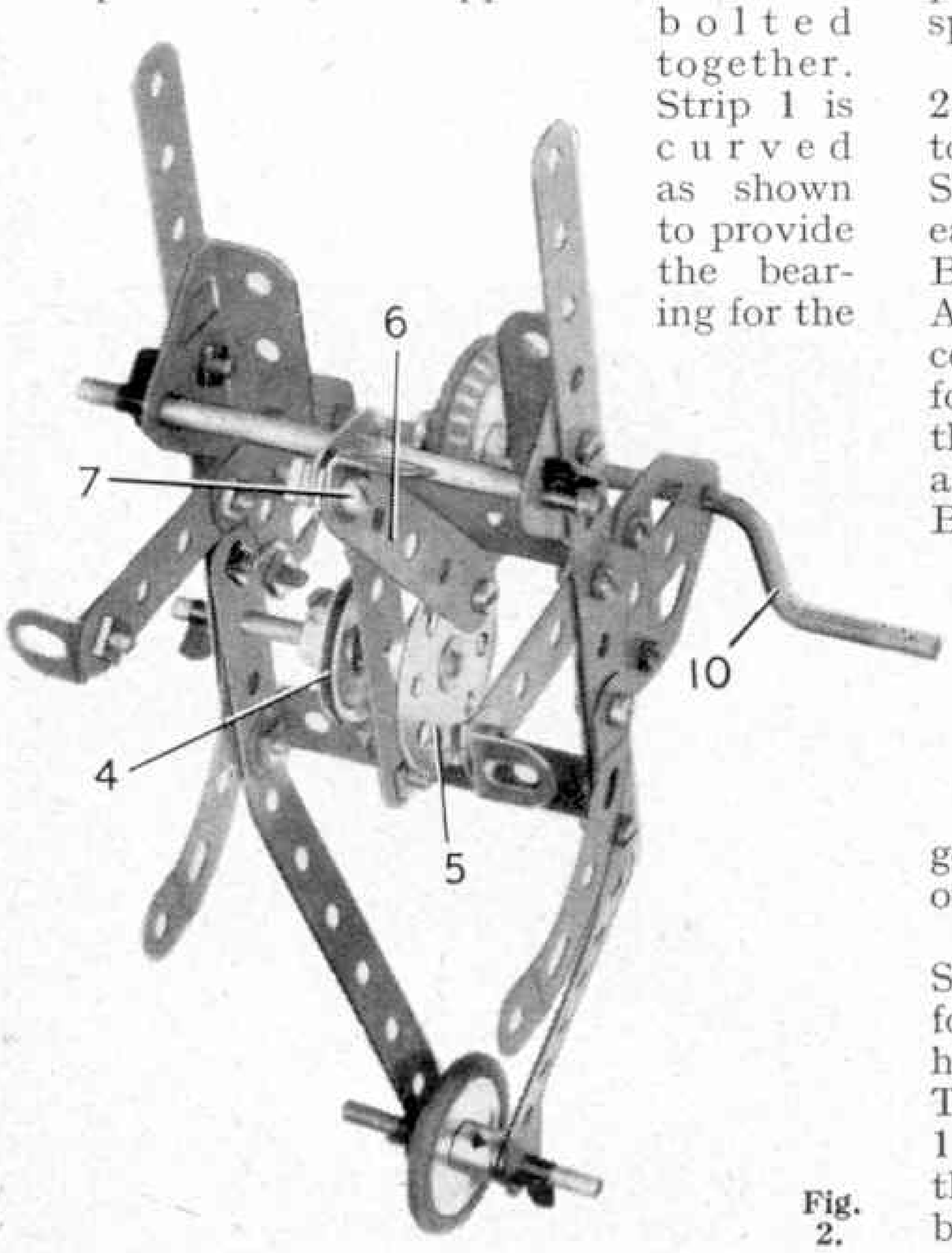


Fig. 2.

Two $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Bent Strips placed $2\frac{1}{2}''$ apart are used to join the two sides together, their lugs being bolted to the $5\frac{1}{2}''$ Strips. In the second holes from one end of each of the Double Bent Strips, an Angle Bracket is bolted. To the free lug of the Angle Brackets a $2\frac{1}{2}''$ Strip is attached. The centre hole of this Strip forms a bearing for the $2''$ Rod 3, which also passes through the $5\frac{1}{2}''$ Strips 1 and 2. A $1''$ Pulley 4 and a Bush Wheel 5 are fixed to this Rod. The Bush Wheel 5 has a $2\frac{1}{2}''$ Strip 6 lock-nutted in one of its holes, and spaced from it by two Washers. Strip 6 has an Angle Bracket bolted in its other end hole, and also a Fishplate lock-nutted on a $\frac{3}{8}''$ Bolt 7.

Through the elongated hole of the Fishplate a $3\frac{1}{2}''$ Rod is passed and it goes also through two Trunnions fixed one on each side of the cart.

The front legs are formed from two Stepped Curved Strips. The rear legs are formed from two $2\frac{1}{2}''$ Strips, each of which has an Angle Bracket bolted in its end hole. The Strips are then bolted to the $5\frac{1}{2}''$ Strips 1 and 2, leaving one hole projecting above these shafts. Two Flat Trunnions are bolted in these holes and also to Fishplates

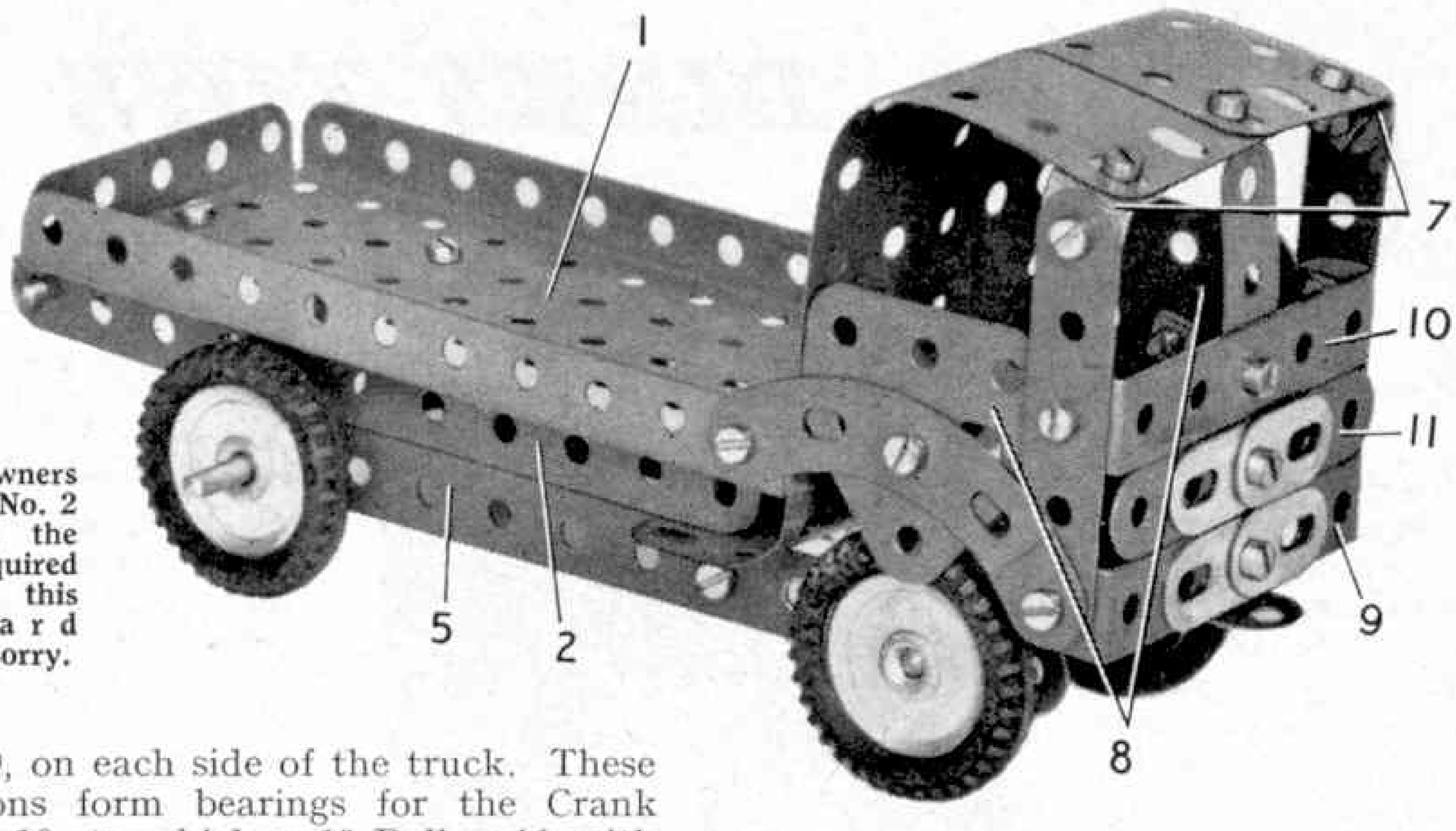


Fig. 3. Owners of Outfit No. 2 have all the parts required to build this Forward Control Lorry.

8 and 9, on each side of the truck. These Trunnions form bearings for the Crank Handle 10, to which a 1″ Pulley 11 with Rubber Tyre and a 1″ Pulley 12 are fixed. Pulley 12 is connected by a Driving Band to the Pulley Wheel 4.

On turning Crank Handle 10, the Pulley 11, which represents the grinder's stone, revolves. At the same time Pulley 12 drives Pulley 4, thus turning Bush Wheel 5 which in turn moves the treadle.

A list of the parts required to build this model is given at the end of this article.

Forward Control Lorry

The chassis of the Forward Control Lorry shown in Figs. 3 and 4 consists of four 5½″ Strips, fixed at each side of the Flanged Plate 1 that forms the platform of the lorry. The upper Strips 2 are bolted to two Trunnions 3, which are fixed by the centre holes of their flanges to the Flanged Plate 1. The apex holes of these Trunnions carry the rear axle, which is a 3½″ Rod having a 1″ Pulley Wheel and 1″ Motor Tyre at each end. The end hole of each 5½″ Strip 2 projects beyond the tail of the lorry, and in these end holes a 2″ Rod is held by means of two Spring Clips. Also projecting beyond the tail of the lorry is a hook to which a tractor can be coupled. This hook is formed by a ½″ Reversed Angle Bracket 4, bolted in the centre hole at the end of the Flanged Plate 1, and having a ⅜″ Bolt fixed in its other end.

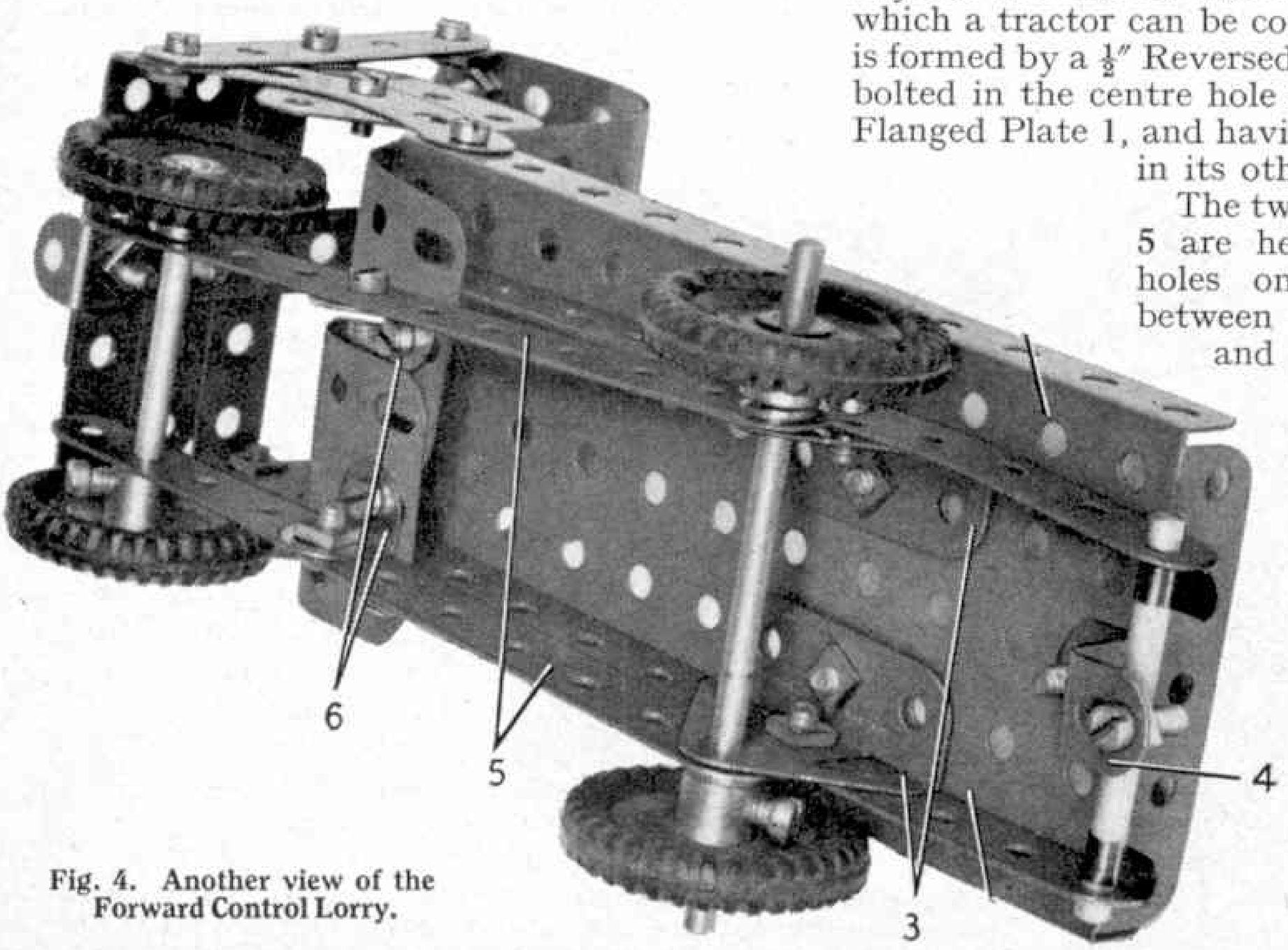


Fig. 4. Another view of the Forward Control Lorry.

The two lower 5½″ Strips 5 are held by their end holes on the 3½″ Rod, between the Trunnion 3 and the 1″ Pulley Wheels at their other ends. The two Strips 5 carry a 2″ Rod in their next-to-end holes, and this forms the front axle. This 2″ Rod carries also two 1″ Pulley Wheels and

(Continued on page 52)

DINKY TOYS NEWS

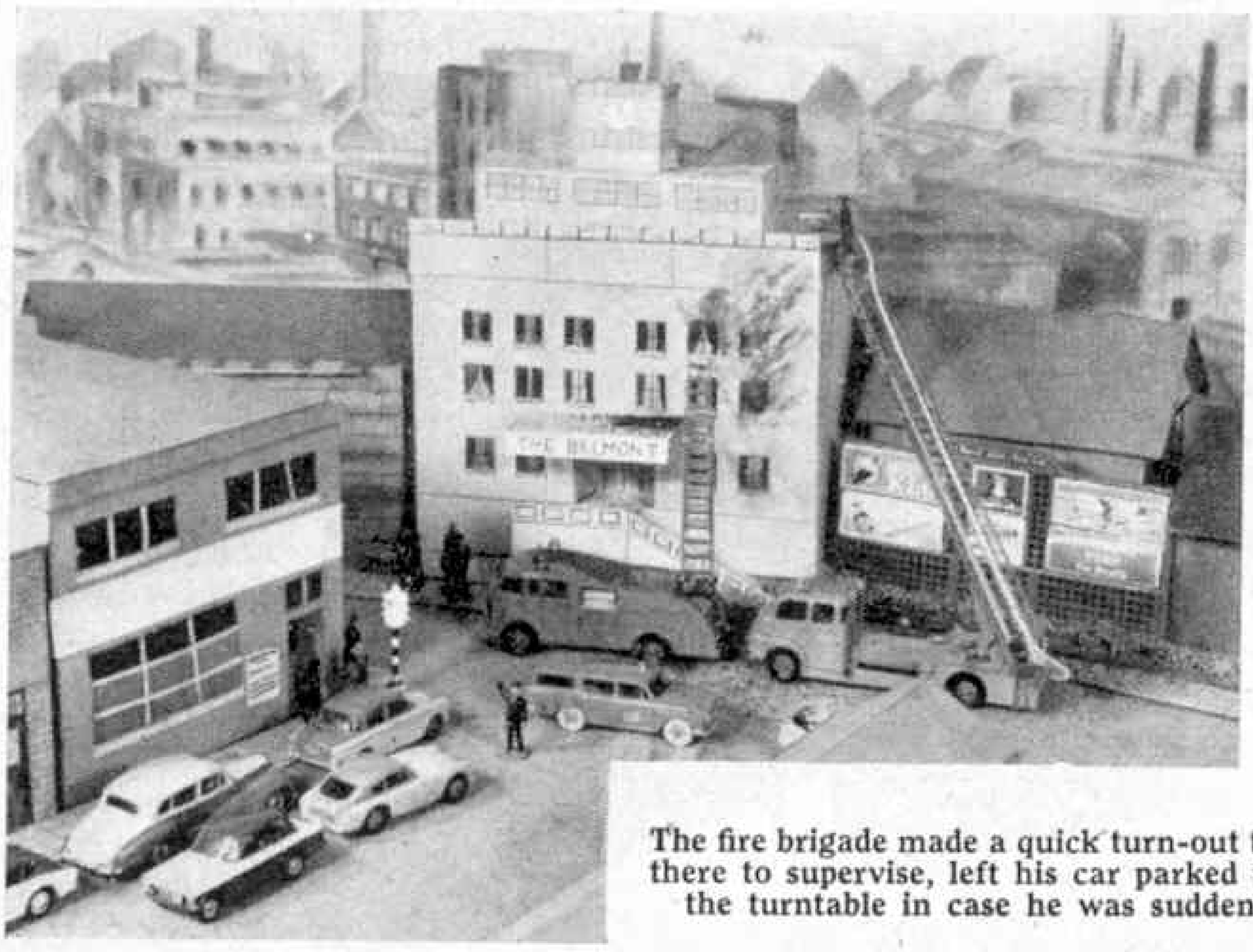
By THE TOYMAN

HERE we are at the start of another year which promises more exciting things for Dinky Toys collectors. I cannot give secrets away, but I can hint that many new, instructive and appealing models are planned in the way of Dinky Toys, Supertoys and their tiny brothers, Dublo Dinky Toys. This last-named and youngest branch of the family stems from the demand for road models made to the same scale as Hornby-Dublo Electric Trains and is, I am pleased to report, thriving.

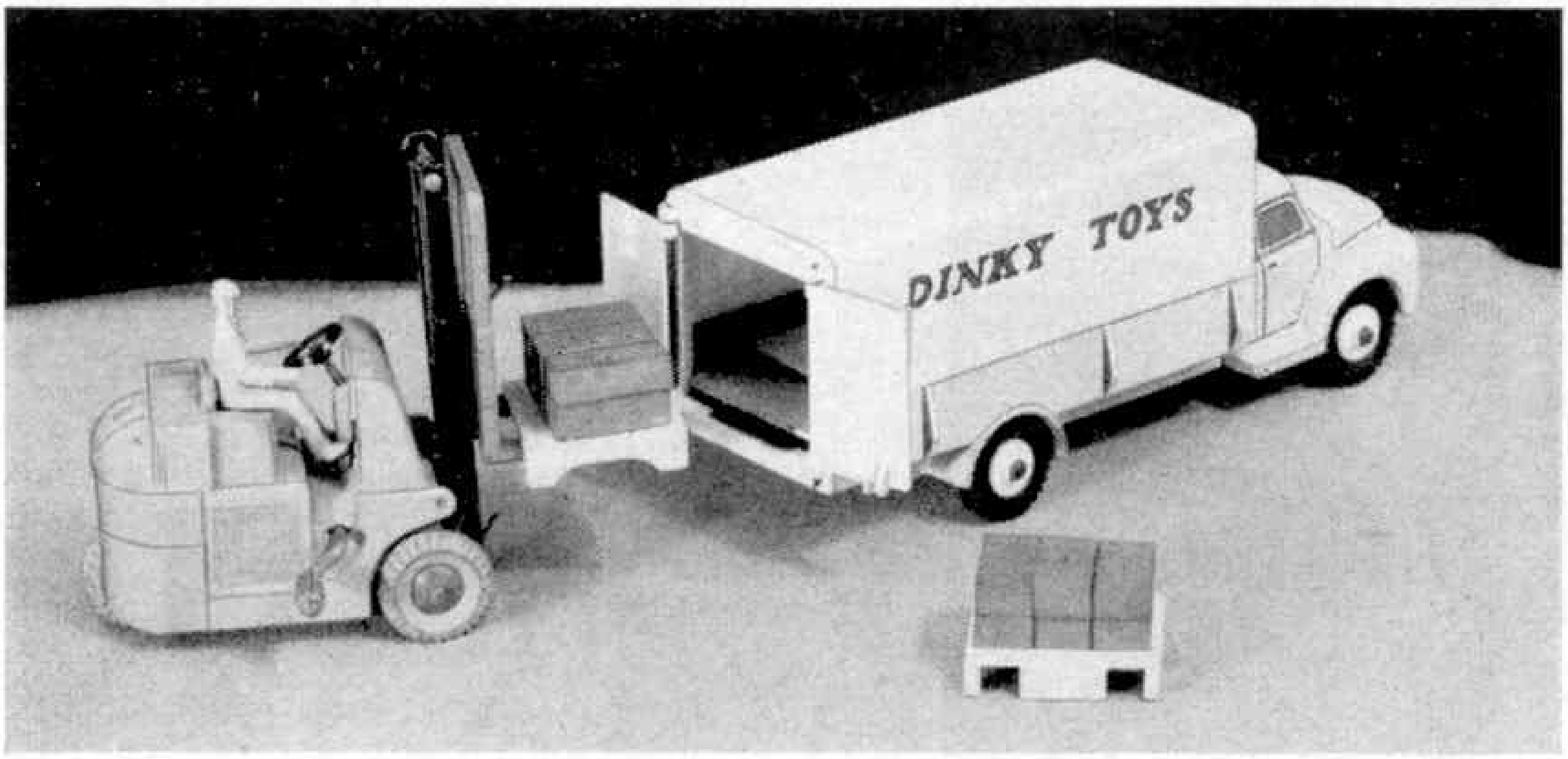
But before we deal with our New Year models let us look at one which appeared in the shops last month. It is No. 257 Fire Chief's Car, fitted with windows and painted in brightest red, with "Fire Chief" in neat white lettering on both sides and an imitation warning light on top. It was designed principally to complete a set with the existing No. 955 Fire Engine with Extending Ladder and No. 956 Turntable Fire Escape, and you can see how excitingly effective they look as a combination in the photograph at the foot of this page. The Belmont Private Hotel, on the outskirts of a big industrial town, is on fire, and smoke and flames are belching from the first and second-floor windows. Fortunately it is daytime, and no one has been trapped in the building. As the firemen tackle the outbreak a knot of spectators has gathered —rather too near the building for safety— and a zealous official is holding back the traffic. In the foreground, adding greatly to the overall effect, is the Fire Chief's Car. You can buy this splendid trio of vehicles as an entity or obtain all three separately.

Greeting readers with a smile is Dinky Toys Club member William O'Brien. William, who is nine, lives at Cambuslang, Lanarkshire.

Now for new items to be released this month. The picture at the top of the next page shows one of the most fascinating models produced by Dinky Toys for some time— the Bedford Pallet-Jekta Van. Meccano Ltd., who use these



The fire brigade made a quick turn-out to this hotel blaze. The fire chief, there to supervise, left his car parked well clear of the fire engine and the turntable in case he was suddenly called to another outbreak.



Loading the Pallet-Jekta Van by means of a Coventry Climax Fork Lift Truck. For the young operator it can be just like the real thing.

vans in the transportation of Dinky Toys, offer this wonderful working model as Dinky Supertoys No. 930. Easy loading is the chief feature of the vehicle and the interior of the model has floors on three levels. Pallets, supplied with the vehicle, are loaded with "goods" and stacked just inside the van. Then, at the turn of a handle, two of the three floors move back in sequence, carrying the pallets into the interior. A third pallet can be stowed at the tail end of the van. Used in conjunction with Dinky Toys Fork Lift Truck (No. 401), which will hoist the pallets into and out of the van, this model can be exceptionally entertaining and instructive. A set of instructions to make the operation of the vehicle quite clear is issued with each van.

My third scene this month will appeal to all readers who find pleasure in making their own layouts and roadside buildings. It is a busy corner, with traffic beginning to flow as the morning wears on, and it introduces traffic signs, which are an essential part of any authentic layout. As most of you know, the road signs in this country have now been re-designed and Dinky Toys are now producing, as No. 772 in their series, an up-to-date set of signs. Numbering twenty-four in all, they consist of town and country signs packed in a brightly-designed box. Some signs, such as the speed restriction markers, which appear essentially in pairs, will be presented in that form, and the whole set makes a first-class addition to any enthusiast's layout, fixed or portable.

A busy day for traffic in the main street of a suburb adjoining a big industrial centre. Road signs (introduced in their new form this month as Dinky Toys No. 772) are featured in this realistic layout.

Incidentally, while on the subject of layouts, may I say that from letters received at Dinky Toys headquarters on

Among those successful in recent Dinky Toys £2 Winners contests were 11 years old J. Philpott of Dorking (above) and Peter Mays of Kilburn, London.

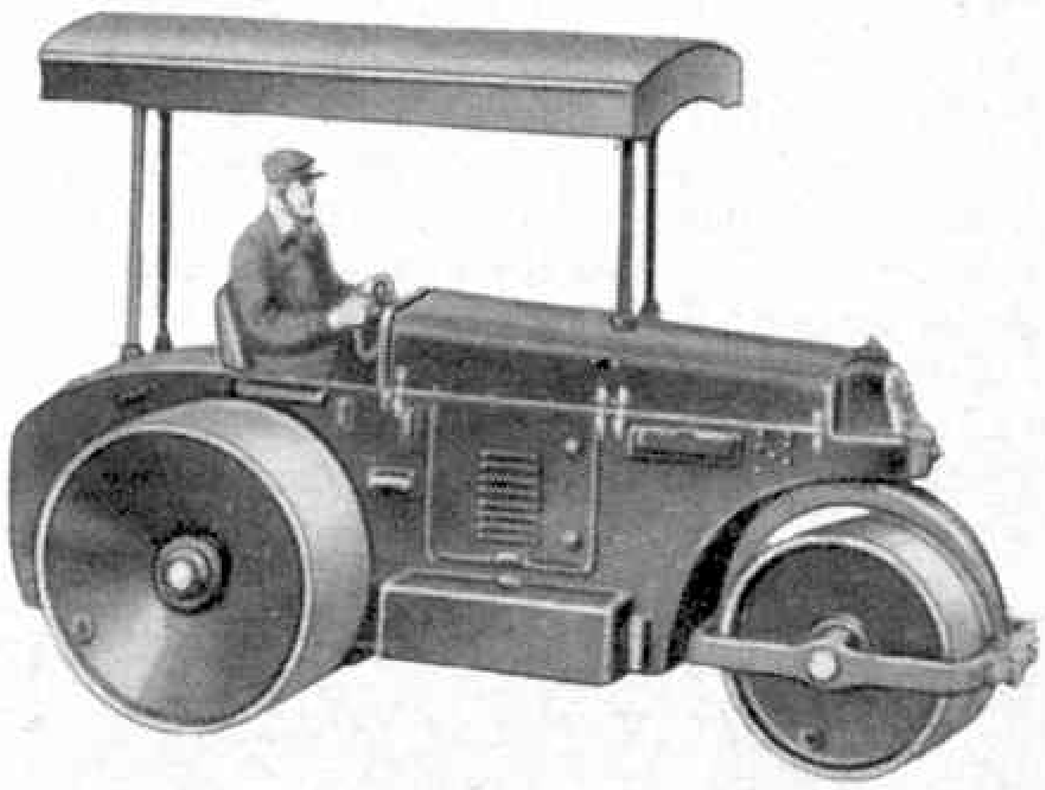
this subject, many youngsters who hold our Collector's Licence seem to be under a misapprehension in regard to the wording on Page 15 of the Licence. Meccano Ltd. do not make imitation road layouts on baseboards as there is insufficient demand for them. In any event, such layouts would be too costly to be included within the range of Dinky Toys. Members of the Dinky Toys Information Service are, however, glad to advise at any time on the making of accessories for layouts, and from time to time notes on the subject appear in these articles.

There is a further point which should be borne in mind at this time of the year, which is an exceptionally busy one at Binns Road. Would all readers writing to the Dinky Toys Club please limit their questions to points connected with current Dinky Toys models. Questions on prototypes, specifications, obsolete vehicles (real and model), etc. often involve considerable research and cause delays in other correspondence.

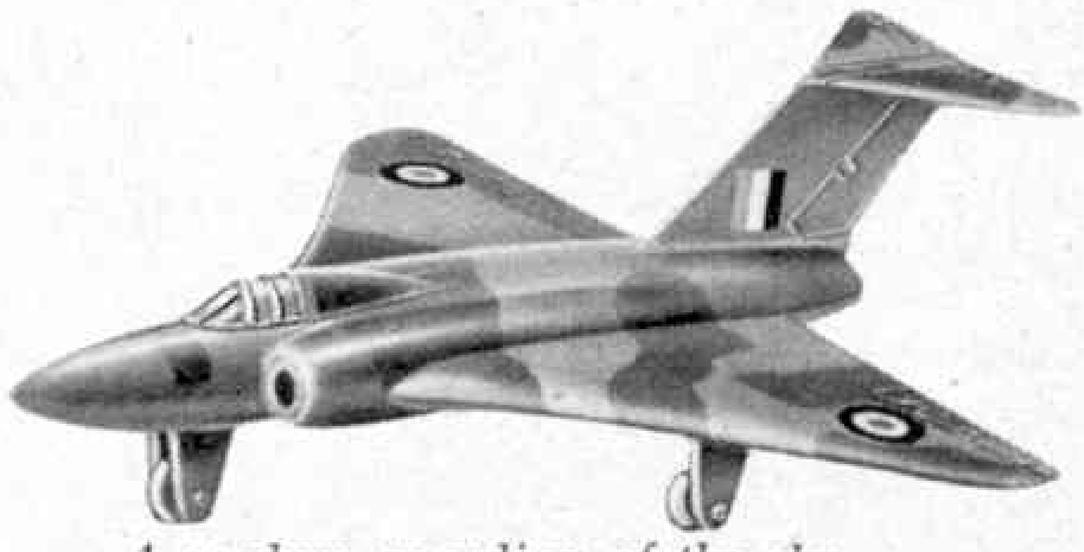
Now, in wishing you all a happy New Year, may I thank the many Dinky Toys enthusiasts who have sent me pictures of themselves and their collections. Three of them make their bow here. They are William O'Brien, who lives in Scotland, and two youngsters from the South of England, J. Philpott and Peter Mays, recent winners in our monthly "£2 Winners" scheme.

Dinky Rhymes

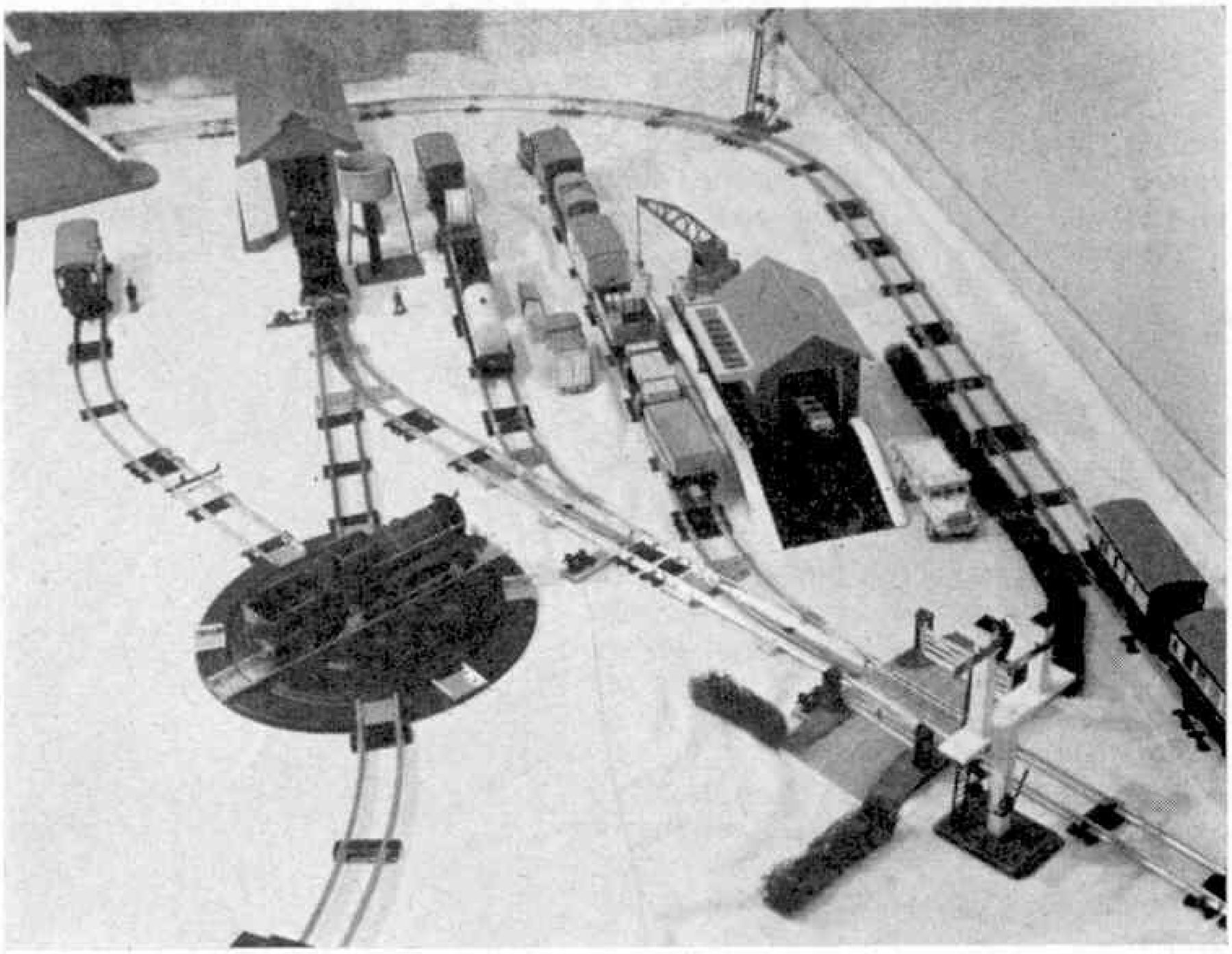
Here is a new series which, month by month, will present in verse—or should I simply say in rhyme?—well-known models in the Dinky Toys range. We start with two established favourites, the Aveling-Barford Diesel Roller and the Gloster Javelin Fighter.



With pace majestically slow,
In pendulum-like manner,
The roller travels to and fro
And flaunts the Diesel banner.



A modern guardian of the sky
In character explicit:
A swept-back wing, a tail raised high—
You simply cannot miss it.



A busy yard scene on the Hornby Clockwork layout operated by W. H. Sleigh and his sons Richard and Neville, showing the Turntable, goods depot, Level Crossing and engine shed. The buildings have been produced at home and they give a splendid appearance to the layout.

"Tommy Dodd" writes about:

A Family Layout with Hornby Trains

HERE we have two fine pictures of a Hornby Gauge 0 clockwork railway that I know gives a great deal of pleasure to the enthusiastic owners. They are Richard and Neville Sleigh, of Churchdown, who with their father have a really good time with their equipment. They devise different layouts from time to time, run all kinds of trains, and make full use of the varied selection of rolling stock that runs on their railway.

I was particularly interested to hear about the boys and their railway from Mr. W. H. Sleigh, as he himself had a large Hornby layout during his own boyhood and his interest and experience are of special value. Some of the rails from this layout are still in use, but the rest of the equipment was passed on to younger enthusiasts in the family during World War II, when miniature railway equipment became extremely scarce. How different things are today! Just over twelve months ago, at Christmas time as you might have expected, Mr. Sleigh renewed his acquaintance with Hornby Trains, for then Richard and Neville, with his aid, began the collection of the locomotives, rolling stock and so on that you see in the illustrations.

The choice of Hornby Gauge 0 train equipment was obviously a wise one, for Hornby rolling stock, and engines too, can stand up to any amount of hard work and to the type of handling that is to be expected when enthusiastic youngsters get busy. Apart from this the use of clockwork permits fresh layouts to be arranged quite easily by the boys themselves, while engines can be run freely anywhere on the layout without reference to each others' movements.

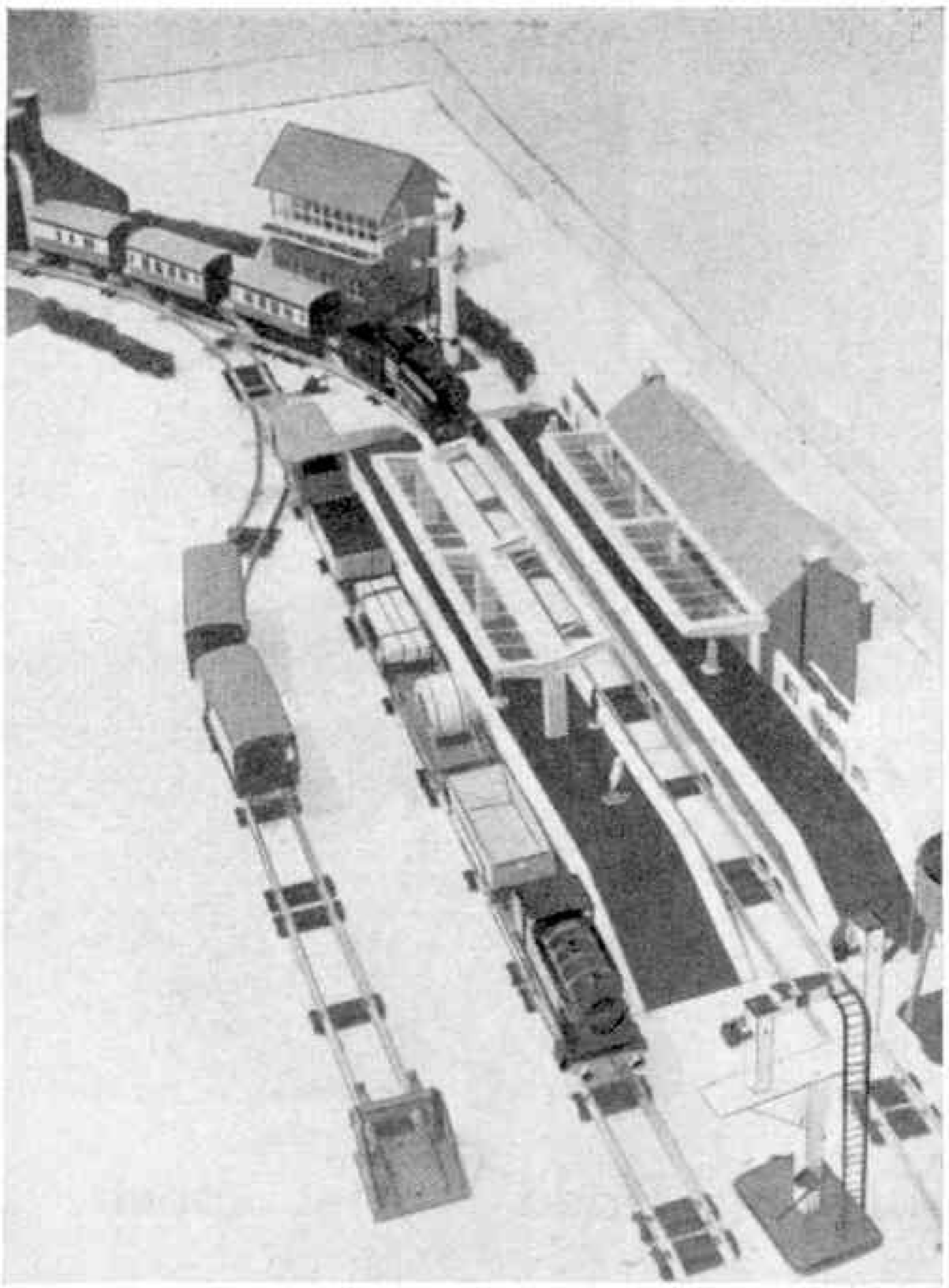
It is clear that a good deal of enthusiasm for the home railway system quickly developed. Mr. Sleigh indeed soon found himself busy constructing many extremely effective lineside buildings and similar items, some of which you can see in the photographs.

The buildings include a station, which is an early necessity on many lines as passenger trains must have somewhere to start and to stop. Very complete attention to detail has been given to the platforms and station buildings and—rightly—to the

roof. One sees a lot of the roofs on a miniature layout! This station roof is removable and when it is lifted off four completely finished and decorated rooms are revealed, including an office for the stationmaster. An interesting point is that access to the platform from "outside" is provided by means of a sloping ramp, which is a change from the steps that are sometimes found in such situations.

Of course there are Hornby Signals alongside the track and therefore a splendid miniature signal box was constructed, fitted internally and lit up when required from a cycle lamp battery housed in the "basement", or rather on the lower floor of the box. Apart from the dummy signal levers in the box, there are two that act as switches connected to two home-built colour light signals.

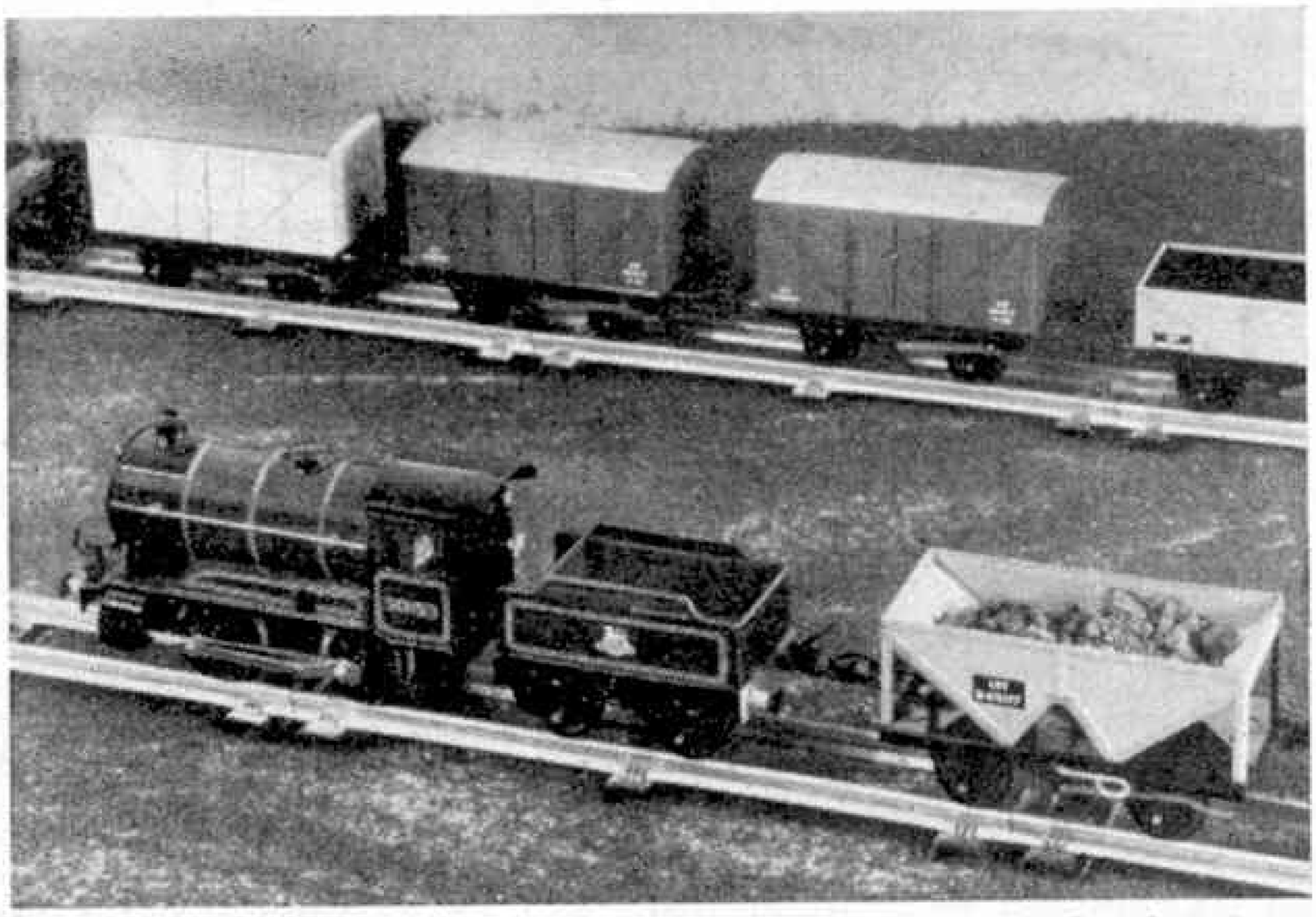
A point of special note in connection with the goods depot is that its general style matches that of the passenger station. As they both belong to the same railway authorities such similarity in style is quite a good idea. The platform accommodates one of the standard Hornby Platform Cranes and good use is made of this in transferring varying loads between platform and rail or road vehicle. A feature of operations is the carriage of actual loads and I know that most of you will agree that this form of activity can be really good fun. This is particularly so if you have the road haulage side of things operated with Dinky Toys.



A fine view of the station on the Sleigh line. A loaded freight train is held in the platform loop while the express that has been following takes the other track through the station. This and the upper illustration on the previous page are from photographs by J. Champ.

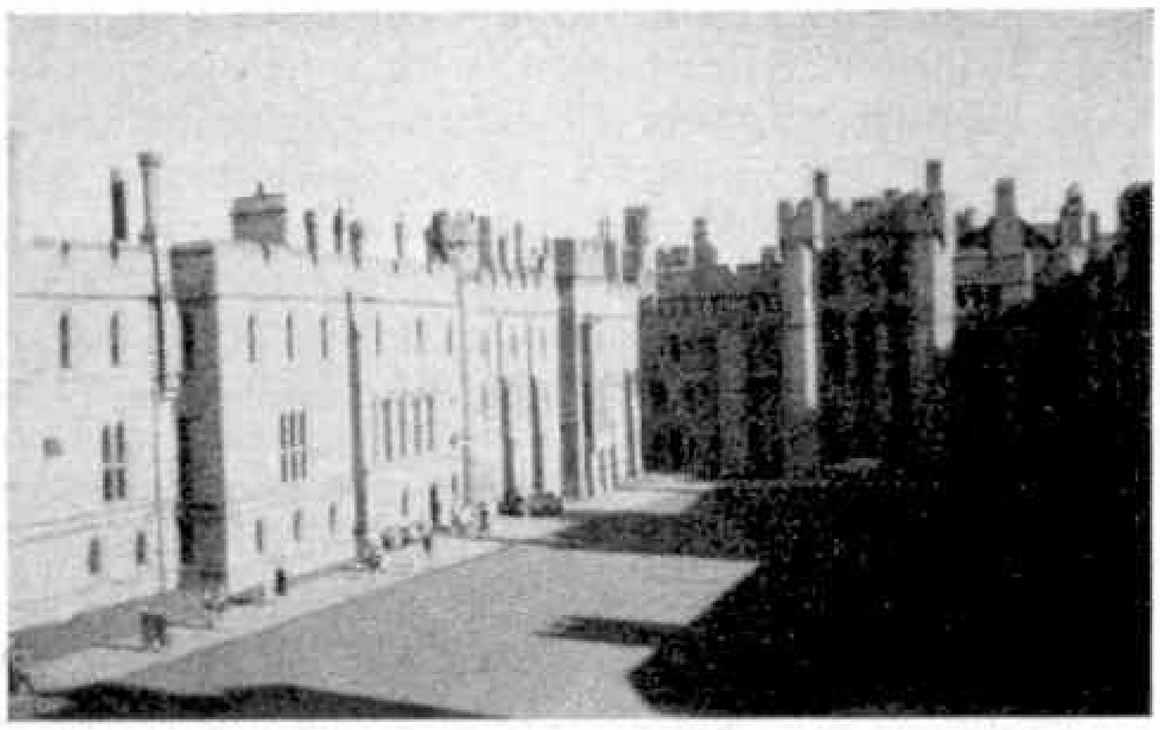
In order to accommodate the engines, which are two in number, there is an engine shed with double doors and with effectively modelled windows and roof. There is one little item about this shed that I particularly like—a side door for the use of the miniature shed staff. A side door for the staff is scarcely necessary in the open type of shed, but with a shed having end doors, it is certainly a good plan to fit or at least represent a side door as well.

The line is sometimes used out of doors, but not of course at this time of the year! Perhaps we may be able to join our friends again during the summer months in their garden.



Hornby No. 50 Hopper Wagons are ideal for the conveyance of various loose loads, and here is the front of a train of them, with a No. 51 Locomotive in charge.

Of General Interest



BUILDINGS are the theme of this month's *Of General Interest*. Both of those illustrated are historic, but one of them has practically always been in the public eye, whereas the other one has been hidden away for a very considerable time.

You will already have gathered that the first one is Arundel Castle, in Sussex. A castle in this position is first mentioned in history in the will of King Alfred who died well over 1,000 years ago. The present Castle is much larger than the original one, for additions have been made to it from time to time in its story. Its Keep is situated on a high mound, and is thought to have been built in the time of King Alfred. The Inner Gateway is a fine Norman archway, dating from shortly after the Norman Conquest, and just over the drawbridge are the Barbican Towers, which were built at the end of the thirteenth century.

There are, of course, a host of absorbingly interesting features of the Castle that amply repay visitors to it. One of them recently has been G. E. W. Buckler, of London, who took the accompanying photograph and gave me the few details in this account.

The building shown in the lower picture, which comes from E. J. Strange, West Bromwich, is vastly different from Arundel Castle. During the demolition of old tenements in part of West Bromwich, the workmen were amazed to discover, beneath the crumbling brickwork, ancient timbers in a wonderful state of preservation. The brickwork was cleared away under the supervision of a well-known architect and the ancient Manor House, built in 1340, was then revealed.

It soon became apparent that the Manor House was complete, with its Great Hall, living rooms and a private chapel. The house has now been restored almost to its full medieval glory—this work is seen in progress in the illustration — and is remarkable for its fine timbered arches, hewn probably from the ancient oak forests of West Bromwich. It is a classic example of fourteenth century architecture.

Mystery of the Moa

New Zealand's Extinct Giant Birds

By V. May Cottrell

ONE of my earliest recollections, when a small child attending a little country school, concerns our school inspector, Henry Hill. It was said of this genial, kindly man that if, during his regular visits of inspection, we presented him with an interesting "bone" we were assured of leniency towards our scholastic shortcomings.

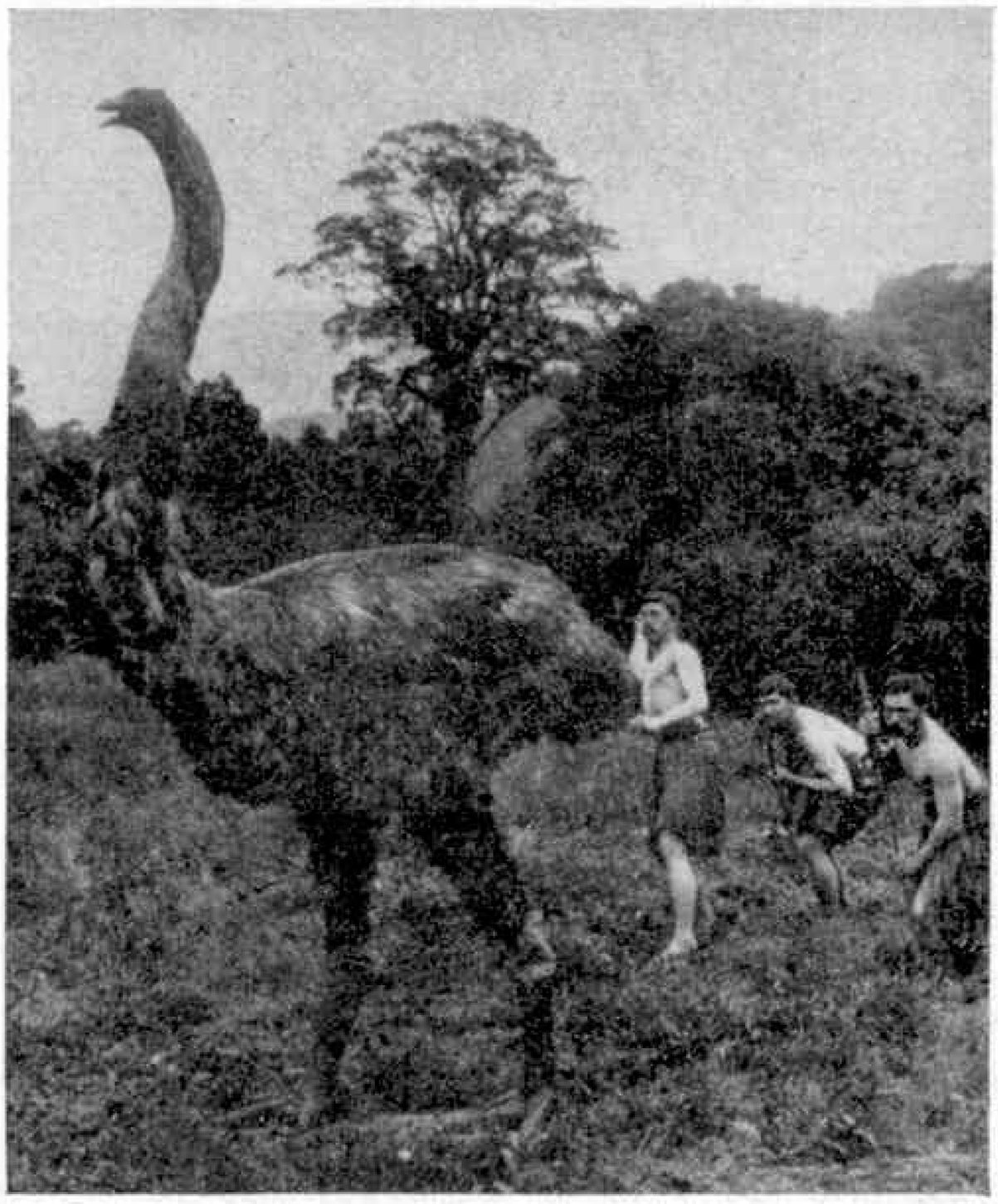
Whether "Old Henry" ever received a genuine moa bone from us remains in doubt. However, during the thirty-five years in which his old buggy—drawn by a succession of easy-going nags—was a familiar sight on our country roads, he did acquire a large and varied collection of moa remains, garnered from various parts of the East Coast district of New Zealand.

For countless centuries that strange flightless bird, the moa, was isolated from the rest of the world in the land now known as New Zealand. In the mild climate, free from natural enemies, the moas throve and multiplied until they thronged the whole of the country in their thousands. Over the years they divided into seven well defined genera, subdivided into twenty-five species, some of which grew to enormous size. Now there are none, but during the past century many skeletons of moas, and quantities of unattached bones, have been found in caves, swamps and river beds.

The very first indication of the past existence of giant birds in New Zealand came from the Maoris in 1836, when they brought bones from the foot of Mt. Hikurangi to a trader, J. S. Polack, whose vessel was wrecked near the East Cape. These relics he described in his book *New Zealand, 1838*, as "large fossil ossifications", and states briefly that the Maoris mentioned some traditions about the moa. But this passing reference to a hitherto unknown bird does not appear to have aroused much interest at the time.

Very different was the reception accorded the next incident in the story of the moas, however. This occurred in 1837, when the shaft of a femur was acquired by Dr. J. Rule, who promptly took it to England and showed it to Richard Owen, Professor of Anatomy at the Royal College of Surgeons, London. After carefully examining this now historic portion of bone, Professor Owen made a famous pronouncement that astonished the scientists of his day and aroused wide general interest.

This bold statement, on which he staked his reputation, was that "there existed or perhaps still exist in New Zealand a race of struthious birds of larger and more colossal size than the ostrich or any known species". This now has long been fully verified. It seems almost incredible that such an accurate conclusion could have been arrived at from the study of a mere fragment of bone, but expert knowledge endows its possessor with remarkable powers of interpretation and deduction.



The scene in this illustration, which was reproduced in the "Otago Witness" in 1903, is a representation of a moa hunt in the days before this huge flightless New Zealand bird became extinct.

After the finding of the first moa bone came further discoveries, some of them quite extensive, from the same locality—the alluvial deposits along the rivers of the East Coast district of the North Island. From here was collected the first shipment of moa remains, which provided Professor Owen with further data and enabled him to publish information about these hitherto

Footprints of the moa in the mud of the bed of the Manawatu River, perhaps made thousands of years ago. Photograph, Dominion Museum, Wellington, N.Z.

unknown birds. The Rev. William Williams, a Church of England missionary, was a most assiduous collector of moa bones between the years 1841 and 43. But it was the Rev. William Colenso, another missionary, who was the first scientific investigator in this field in New Zealand to publish his findings.

It was at first thought that there was only one species of moa, but the varied collection of bones already accumulated soon disproved this theory. For it soon became fully apparent that these bones could not possibly all belong to the same species—they varied too much in size and type for that. Some of the skeletons that were first pieced together were later found to contain bones belonging to different species!

It was realised only after much study that seven distinct genus of moas had roamed New Zealand at various times and in various places, and that these again were divided into no fewer than twenty-five different species, with differences in bone structure and stature.

The principal finds of moa remains have been unearthed from swamps, large pot holes, river beds and banks, sandhills and dry limestone caves long sealed by earth subsidences. In some instances these finds have been astonishingly numerous. Thus the bones of as many as 800 of these extinct birds were dug up in 1939 from one particular locality—Pyramid Valley in the South Island. Digging operations in this swamp have continued intermittently since that date, and a six days' dig in 1948 yielded fourteen moa skeletons, while during January and February 1949, Ronald Scarlett and Jim Eyles — a school boy — recovered 70 moa skeletons from a trench 68 yards long and eight wide.

Whole cartloads of bones belonging to various species of moa have been taken from other swamps in both Islands, while dry limestone caves have yielded large quantities of bones and, in some instances, a large number of more or less complete skeletons. As late as 1943, the bones of no less than 30 moas were found in a cave at Waikaremoana. All this has been taken to indicate that the birds met their fate in great numbers at a time in these particular places, from causes that can only be surmised but never fully proved.

It is believed, however, that in some instances they were driven *en masse* into swamps to escape from bush or grass fires and were mired in the treacherous mud to perish miserably. In other cases it is thought that large numbers must have been drowned during great floods and their bodies washed into lakes since drained and transformed into swamp areas. Those found in self-sealed caves in a good state of preservation at Waikaremoana, and elsewhere in the North Island, are believed to have been seeking shelter from some ancient wholesale cataclysm such as violent volcanic activity, with its accompanying release of poisonous gaseous fumes, hot ash and falling rocks.

The immense antiquity of some of the moa remains supports the belief that moas must have reached New Zealand in the remote past when this country was joined to the land masses of Australia, Asia and Antarctica. For as the moa was flightless

it would, of necessity, have to walk there while these ancient land bridges still existed, and was later isolated from birds of a somewhat similar type by the break up of the then existing continent.

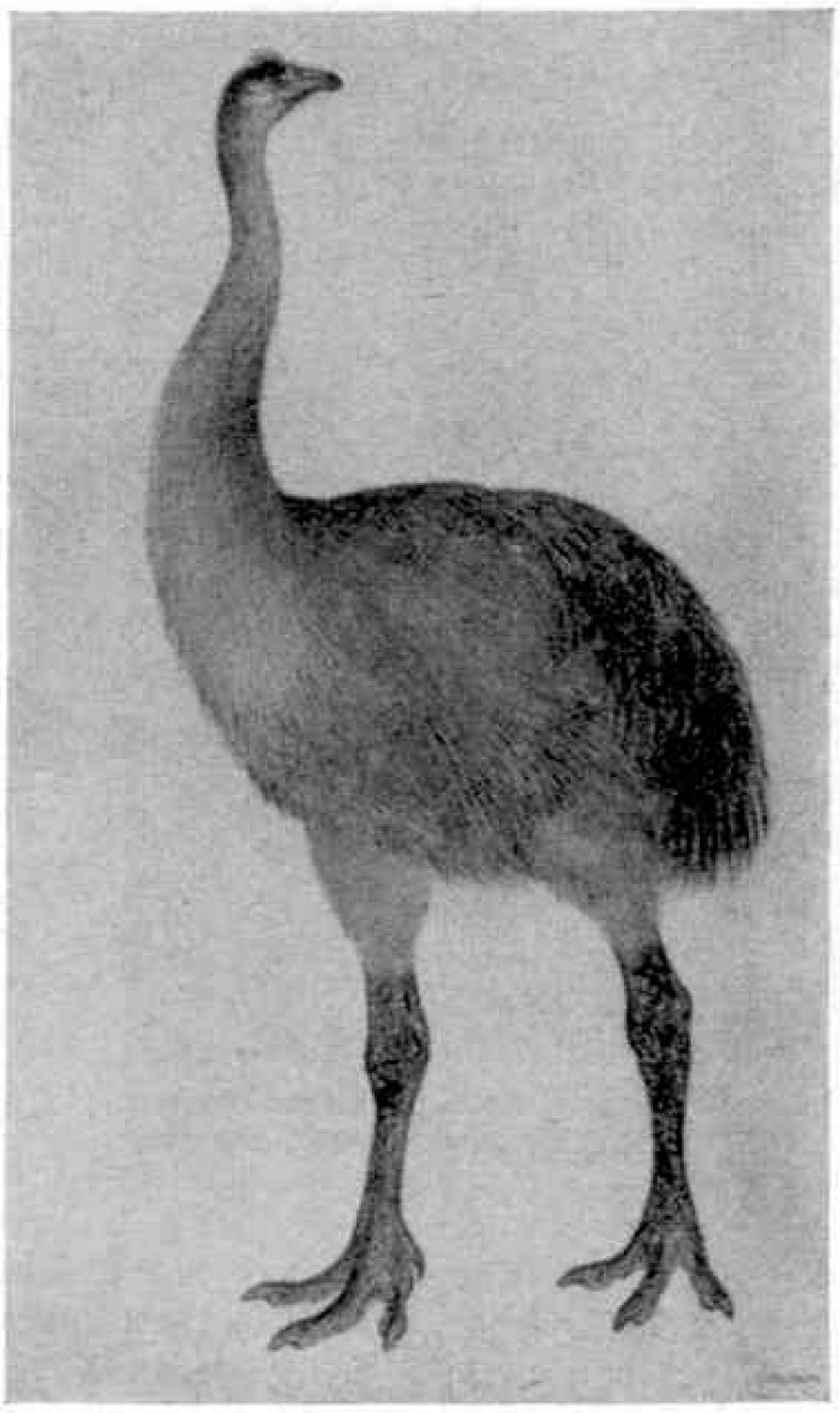
The moa's nearest relatives among flightless birds are the ostrich (Africa), the rhea (South America), the cassowary and the emu (New Guinea and Australia), and the extinct *Aepyornis* (Madagascar) and *Dromornis* (Australia).

The first Maori migration from Hawaiki arrived in New Zealand about the year A.D. 950 That these early Maoris and their descendants hunted the moa is now certain, as is also the part they played in its ultimate destruction. This has been proved conclusively by the finding, in various localities, of moa bones in the native ovens and kitchen middens of the ancient Maoris. These bones had obviously been broken to extract the marrow, and discarded after the flesh had been cooked and eaten.

The localities in which moa bones have been found clearly indicate that they were not forest dwellers, like their distant cousins the kiwis, but lived in open country and frequented swamps and rivers. They are known to have been vegetable feeders because of the gizzard stones so often found with their skeletons, or among unattached piles of bones. A weight of no less than 7 lb. of these stones was collected from one skeleton alone. Pebbles and small stones were swallowed by moas for use in the grinding of their principal fodder, which was coarse grass from the tussocks that covered extensive open plains up to the advent of the white settlers.

As no perfect specimens of moa eggs had been found up to 1856, W. B. D. Mantell roughly restored a sufficient number from fragments to give some idea of their size, shape, colour and texture. Similar restorations were also made at the British Museum, and the structural differences between the eggs of a number of species had been worked out.

It was not until 1865 that anything like a perfect egg reached England. This egg was found at Kaikoura in 1860 by the owner of one of the whaling stations while he was excavating for the foundations of a store. The workman's pick penetrated an ancient Maori grave that disclosed a human skeleton in a sitting posture, with the egg resting in its bony hands. The egg measured 10 inches in length by 7½ inches in breadth, with the shell 1/12th of an inch thick.



A fine reconstruction of a New Zealand moa. Photograph, Crown Copyright, Science Museum, London.

Eighty years later a similar find was made by Jim Kyles, a thirteen year old schoolboy, at Wairau bar near Blenheim. This egg was drilled, as were other eggs found in the same locality. From this it is presumed that the ancient Maoris who camped at the bar used the moa eggs as containers for carrying water.

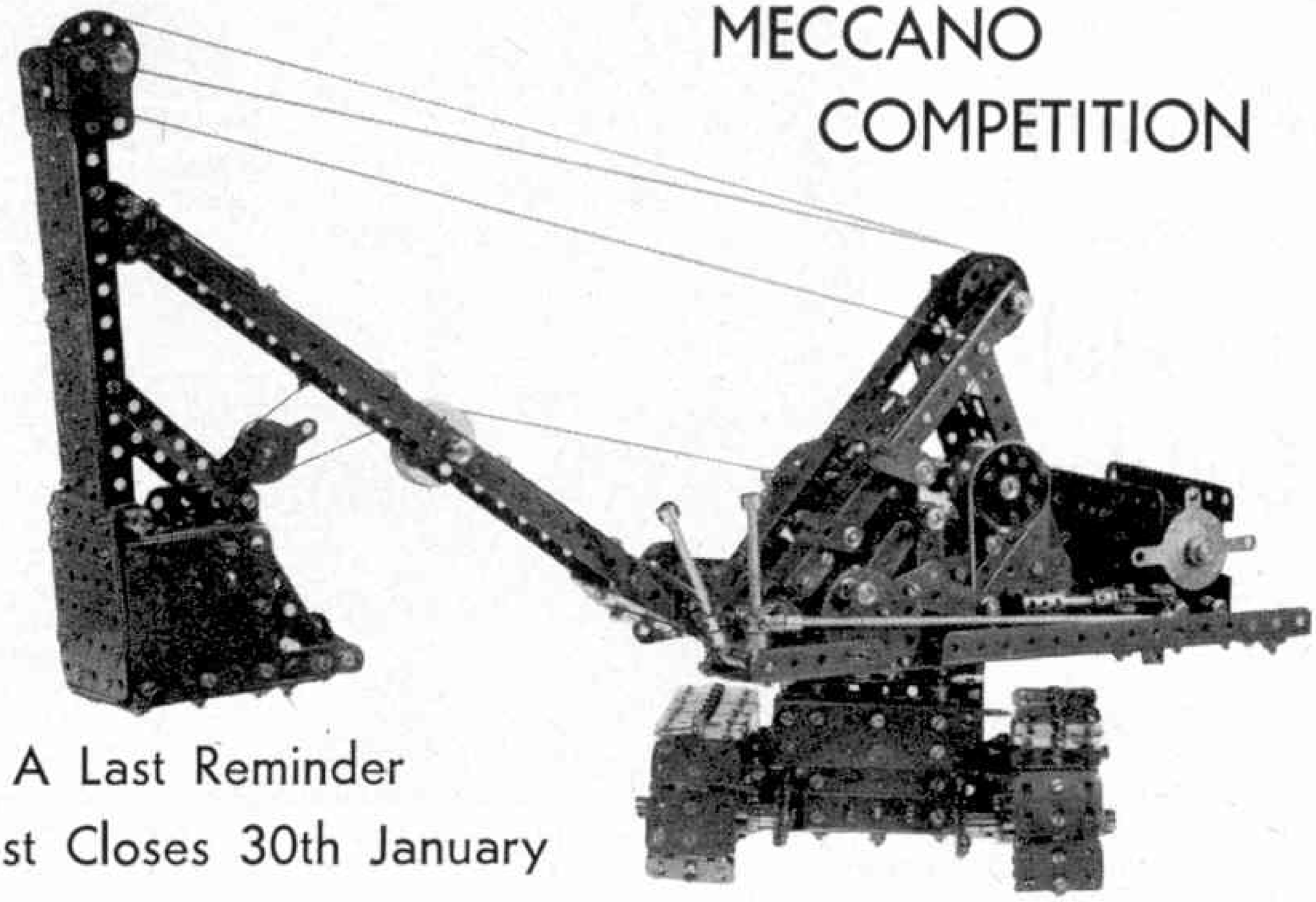
Incredible as it may seem, numerous feathers belonging to the various species of moa have been found in several different localities. These feathers are grey or brownish-grey in colour and dark brown with reddish tips. Some of them measure about 7 inches long and 1½ inches wide.

One would hardly expect to find actual footprints of a bird long vanished from the earth, but such has indeed been the case in several instances. A section of hard packed mud containing deeply indented markings of the three great toes of a large moa is now in the Dominion Museum, Wellington.

No man now living has seen a moa; no camera has recorded its activities in Technicolor for the Vista-vision screen; no tape-recorder has reproduced its mating call; and as far as we know no primitive artist has engraved its image on the rocks or sketched its likeness on the walls of caves.

So what did moas really (Cont. on Page 52)

MECCANO COMPETITION



A Last Reminder

Contest Closes 30th January

A model mechanical shovel, without housing, built by Peter Lewis, Bridlington, as an entry for a previous "M.M." Competition.

THE Winter Model-Building Competition, in which cash prizes are offered for the most original and best built Meccano models of any kind, closes at the end of this month, and we wish to remind readers who have not yet sent in their entries that they should do so without further delay.

For the benefit of those who may not have seen the previous announcements of this Contest, we repeat the main details and the few simple conditions that competitors have to fulfil. First, the Competition is open to everyone who owns a Meccano Outfit no matter what size or what his age may be. Also it is not necessary to live in this country; readers in any part of the world are eligible to take part in the Competition.

The prizes, details of which appear in the panel below, will be awarded for those models that are the most original in design and subject, and are the best built and proportioned. Models of any type or size are suitable for entry, and the main thing is to choose a subject that can be built strongly and realistically from the parts available to the competitor.

The Competition will be divided into the following two Sections: A, for competitors living in any part of the world and under 14 years of age on 30th January next, and B, for competitors aged 14 years or over on 30th January, 1960.

A separate set of prizes will be awarded in each Section.

As models of any kind whatever may be submitted, you have a very wide range from which to choose your subject. A model that really "works" or that may be put to some practical use, will stand a better chance of winning a prize than a model that is not built to work. Any number of parts may be used in building models, but good solid construction will count more than mere size alone.

When preparing your entry you should take care to write your age, name and address clearly on the back of each photograph or drawing submitted.

Finally, you must post your entry in time to reach this Office on or before 30th January, 1960, and the envelope should be addressed "November Meccano Model-Building Competition, Meccano Ltd., Binns Road, Liverpool 13".

THE PRIZES

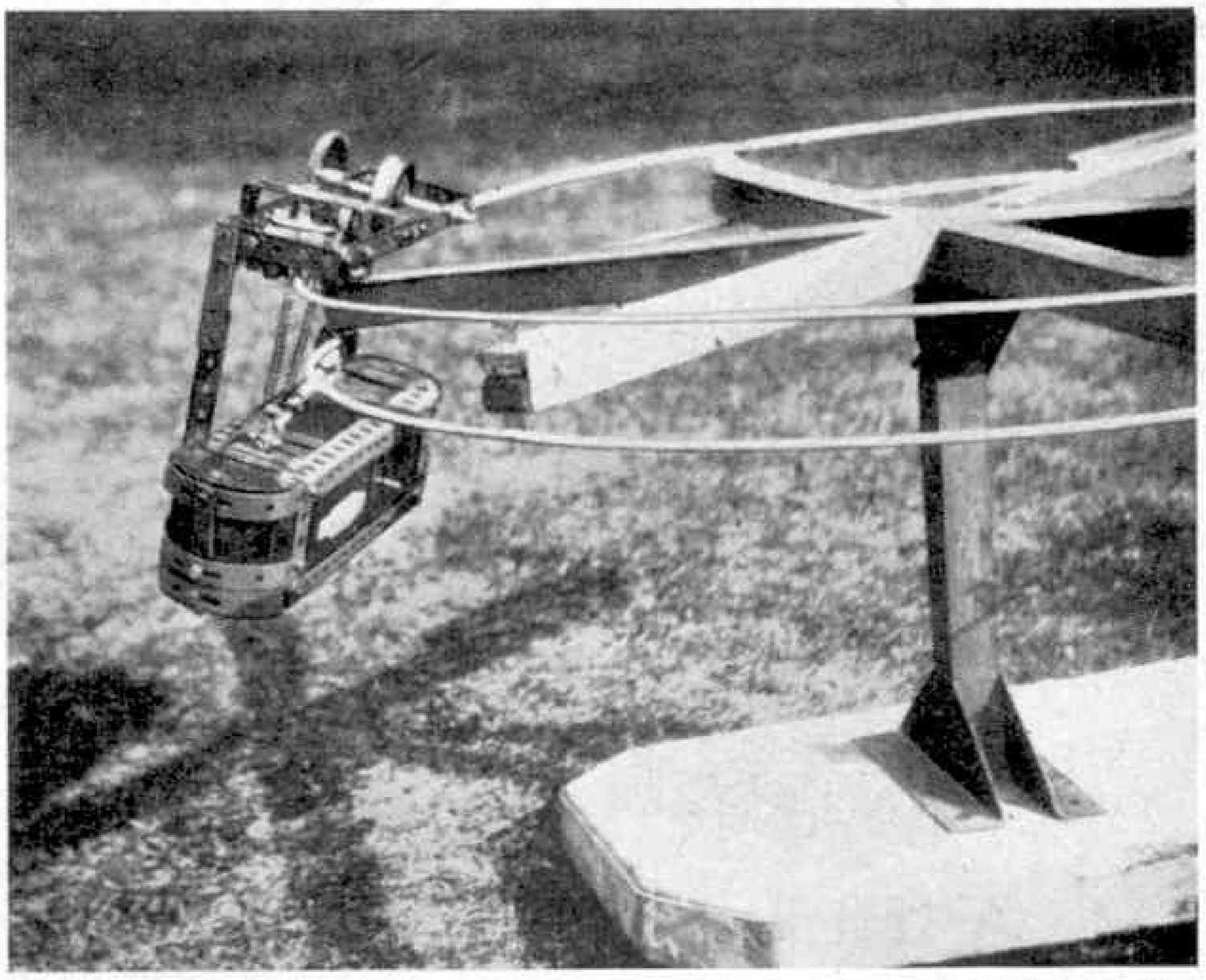
The following set of Prizes will be awarded in each of the Sections A and B:

	£	s.	d.
First, Cheque for	**4**	**0**	**0**
Second, Cheque for	**2**	**0**	**0**
Third, Cheque for	**1**	**0**	**0**
Ten Prizes each of		**10**	**0**
Ten consolation awards each of ..		**5**	**0**

A number of Certificates of Merit also will be awarded.

Among the Model-Builders

By "Spanner"



Part of an attractive Mono-railway built by Messrs. A. K. M. Bristow and T. O. R. Shaw, Sutton Valence.

A Monorail Car System

From Mr. A. K. M. Bristow, Sutton Valence, I have received photographs of a model mono-railway that, in conjunction with a school-friend, T. O. R. Shaw, he built and exhibited at the Sutton Valence School Speech Day last year. Part of the mono-railway is seen in the illustration at the top of this page, where the car is shown rounding the bend at one end of the track. The car is powered by an E20R(S) Electric Motor, which drives the single driving wheel, and a rotating single front wheel, the only other means of support, is used to guide the car around the sharp curves of the track. The car is 10½ in. long, and attains a speed of over 3 ft. per sec. The track is made of galvanised iron wire and is supported by wooden supports, with a copper pick-up wire to complete the electrical circuit.

Bearing for Small Cranes

One of the many different ways in which ball bearings can be built for use in model cranes is shown in Fig. 1. In this example, the lower 3″ Pulley 1 is fixed to the top of the tower or in the case of a mobile crane the chassis of the model, and this in the illustration is represented by the Flanged Plate. The same bolts fix also a Wheel Flange, not shown in the picture. The Wheel Flange is placed centrally on top of the Pulley. Then ⅜″ Balls are placed in the space between the flange of the Wheel Flange and the rim of the Pulley 1. A Rod is gripped in the boss of the fixed Pulley and on it a second 3″ Pulley 2 is mounted. This latter part, which is used to support the cab, is held in place by a Collar fixed above it on the Rod.

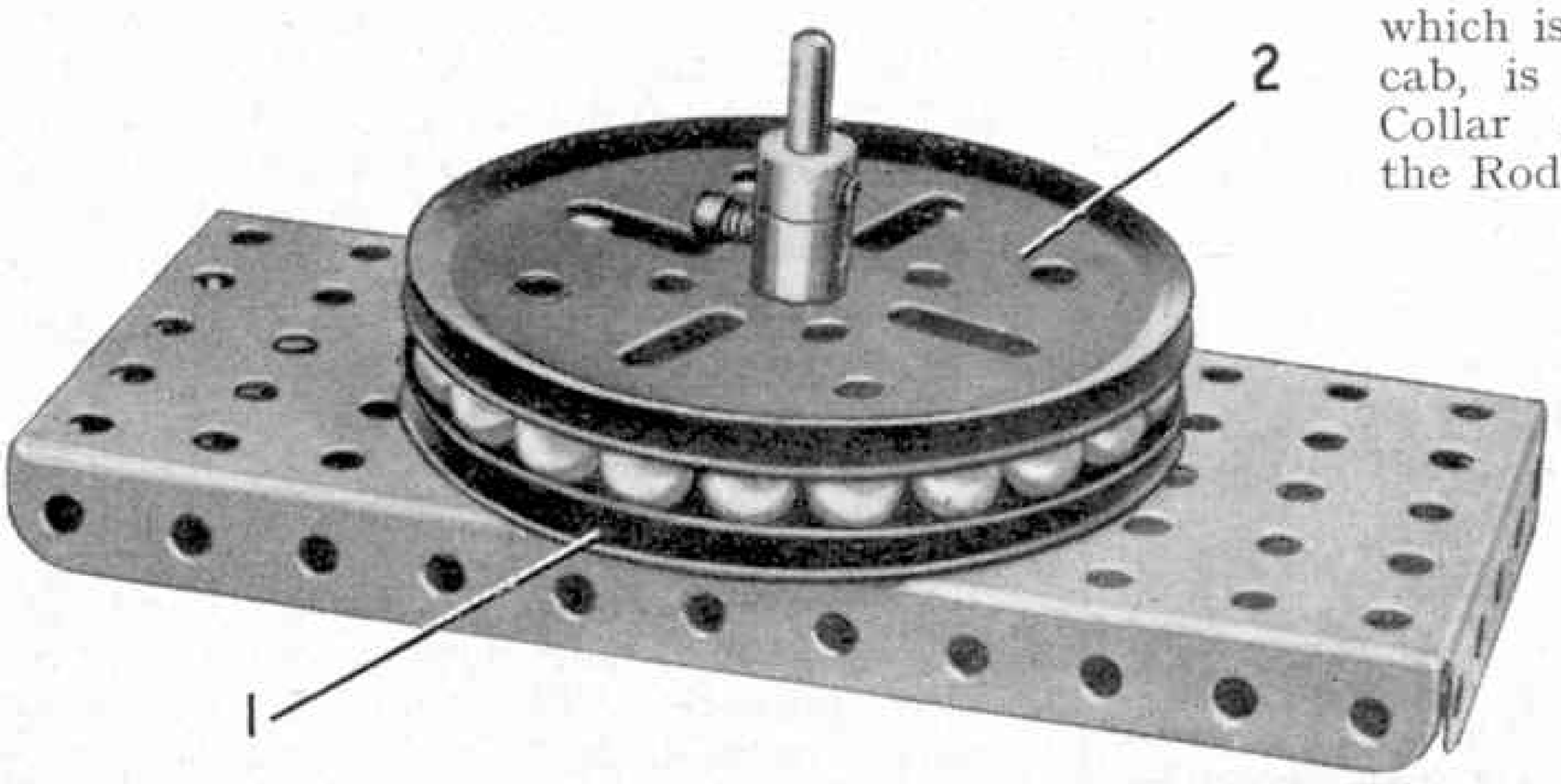


Fig. 1. A small bearing of a type that can be used to support the swivelling cab of a crane, or other similar structure.

Safety Device for Cranes

In actual practice most cranes are fitted with devices to warn the driver when the load being lifted exceeds that for which the crane is designed. The safe load for a jib crane varies with

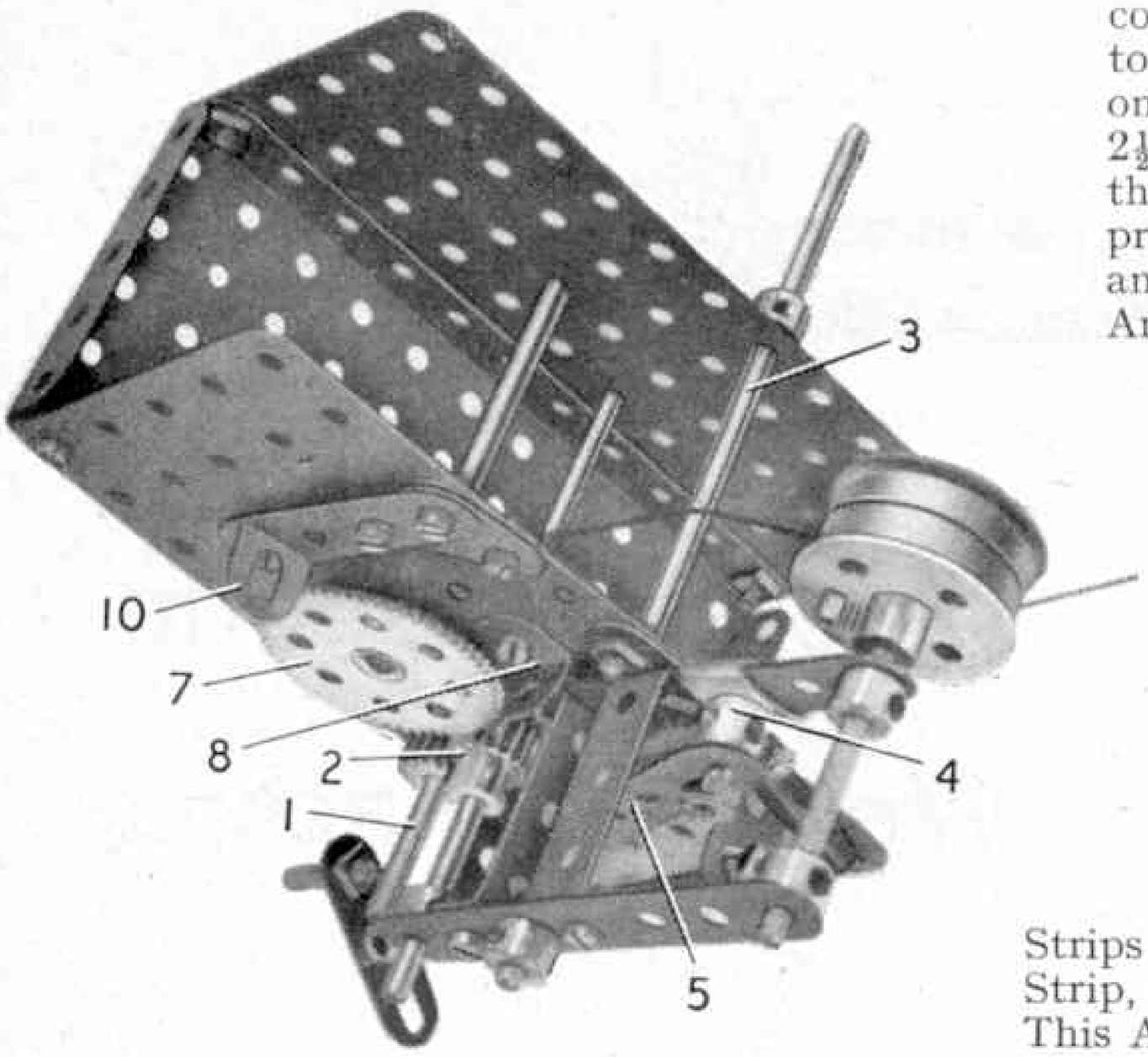


Fig. 2. A novel safety device designed to prevent overloading of a crane. It is the work of Mr. W. Johnstone, Kirkby, Liverpool.

the angle at which the jib is set. As the radius at which the load is slung increases, so the safe load that can be raised is reduced. The mechanism shown in Figs. 2 and 3 represents a simple automatic crane safety device built entirely in Meccano. This mechanism is designed to disconnect the drive to the hoisting drum immediately an attempt is made to lift a load in excess of the safety limit, and at the same time a brake is applied to the winding drum shaft. The safety limit can be varied according to the angle at which the jib is set, simply by turning a handwheel, but if desired the action can be made fully automatic by connecting the variable control by levers to the jib, so that any alteration of the jib angle results in automatic adjustment of the safety cut-off.

The drive to the mechanism is taken to a Rod 1 carrying a ½″ Pinion that is in constant mesh with a ½″ Pinion 2. The latter is fixed on a short Rod mounted in two 3½″ Strips connected by a 1½″ × ½″ Double Angle Strip and pivoted on a Rod 3, which is supported in the framework. A Slide Piece 4 is passed over one of the 3½″ Strips and is pivotally connected to a 3″ Strip 5 that is linked to a Coupling. The Coupling is threaded on to a Screwed Rod supported in a 2½″ × 1″ Double Angle Strip bolted to the framework. The Screwed Rod is prevented from sliding by lock-nuts and carries a handle formed by a Double Arm Crank. A Spring 6 is arranged between the Slide Piece 5 and the framework as shown.

The Pinion 2 normally meshes with a 57-tooth Gear 7 on the winding drum shaft, an Angle Bracket 8 limiting the movement of the 3½″ Strips on Rod 3 to prevent the Pinion and the Gear from meshing too closely. The Spring ensures that under normal circumstances the Pinion and the Gear remain in mesh. A Strip 9 bolted to one of the 3½″ Strips supports a 1″ Corner Bracket and a 2″ Strip, which carries an Angle Bracket 10. This Angle Bracket is arranged just above the teeth of Gear 7 when Pinion 2 is in mesh with the Gear.

The hoisting Cord passes from the drum round the two 1⅛″ Flanged Wheels, locked on a Rod carried in the outer ends of the 3½″ Strips. Normally the tension of Spring 6 overcomes the pressure of the Cord on the Flanged Wheels, and the drive is transmitted from Pinion 2 to the Gear 7. A load exceeding the safe limit results in the pressure of the Cord raising

(*Cont. on page xxii*)

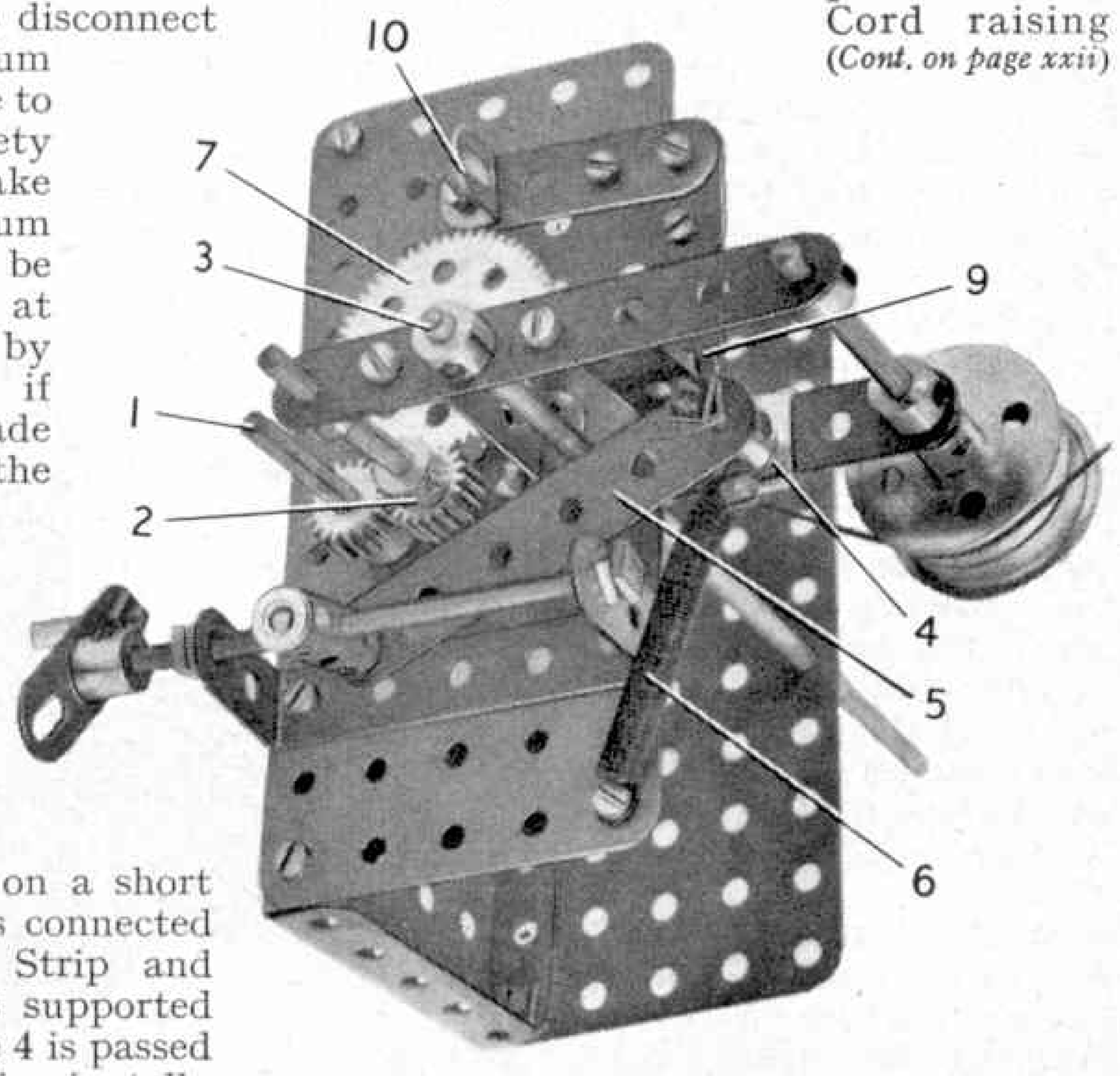


Fig. 3. Another view of the crane safety device.

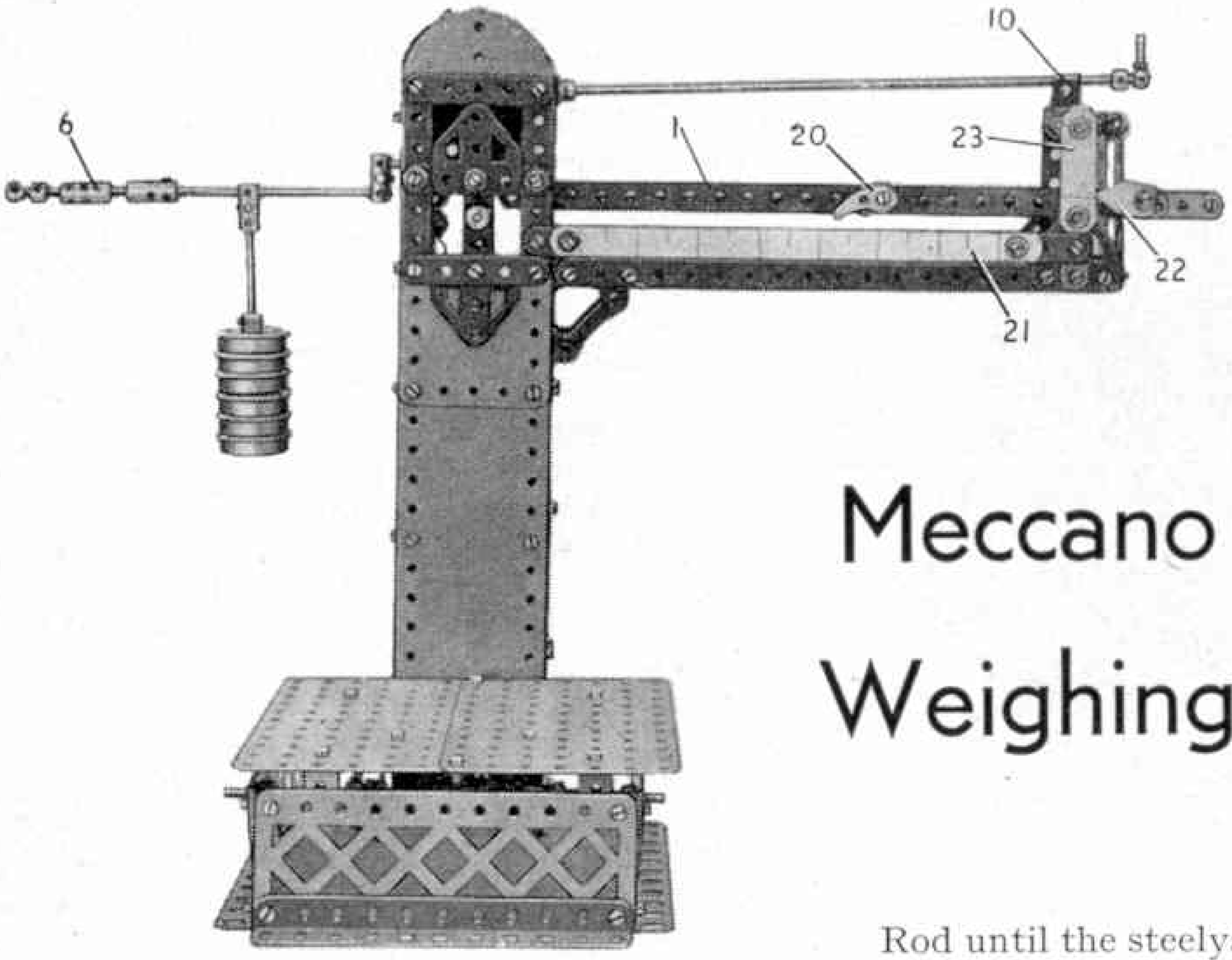


Fig. 1. A Platform Weighing Machine of a practical working type.

Meccano Platform Weighing Machine

THE platform weighing machine that is shown complete in Fig. 1 is remarkably accurate in operation, and after careful adjustment will register weights up to several pounds.

The base of the model is built up from 5½″ Angle Girders and Double Angle Strips bolted together as shown. The upright column is formed by four 12½″ Angle Girders. These are joined together by 1½″ and 2½″ Strips, and the sides and front filled in by Flexible Plates.

The steelyard consists of a 12½″ Strip 1, and an 11½″ Rod extending along the back of this Strip is secured to it by two Couplings, one of which is shown at 2. A 3″ Rod in the Coupling 2 passes through further Couplings 3 and 4 and enters another Coupling in which a 4″ Rod 5 is secured. This Rod carries the balance weights, which may be positioned at any point along the length of the Rod. The Rod 5 carries at its outer end a Threaded Coupling holding a 2″ Screwed Rod.

Accurate adjustments are made by means of a second Threaded Coupling 6, which is moved along the Screwed Rod until the steelyard is exactly balanced.

Friction is reduced to a minimum by the incorporation of a knife-edge bearing of similar type to that used in an actual machine. It consists of two Centre Forks 7 held in the Coupling 3. The points of these rest between the teeth of two ½″ Pinions, so that the whole weight of the steelyard is supported by the steel points of the Centre Forks, giving an exceptionally delicate balance. The ½″ Pinions are fixed to a 2″ Rod locked in Cranks attached to the 3½″ Strips 8. These Strips are pivoted at their upper ends to a Coupling secured to the 11½″

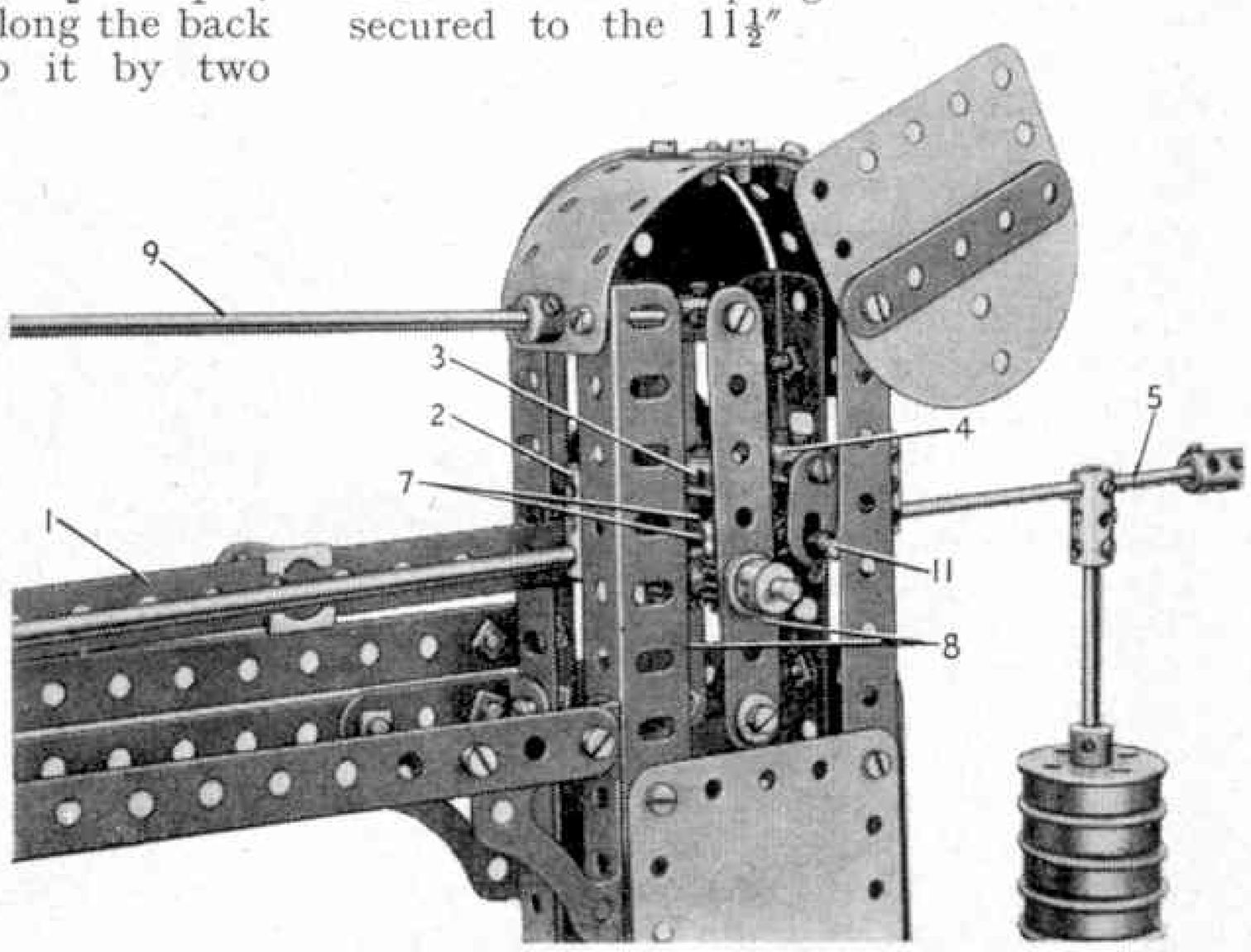


Fig. 2. The top of the Weighing Machine column with the cover plates removed.

Rod 9. This Rod passes through the centre hole of a 1½″ Strip forming part of the framework of the column, and is held in position by two Collars. A stop for the Rod, consisting of a Reversed Angle Bracket 10, is provided at the outer end of

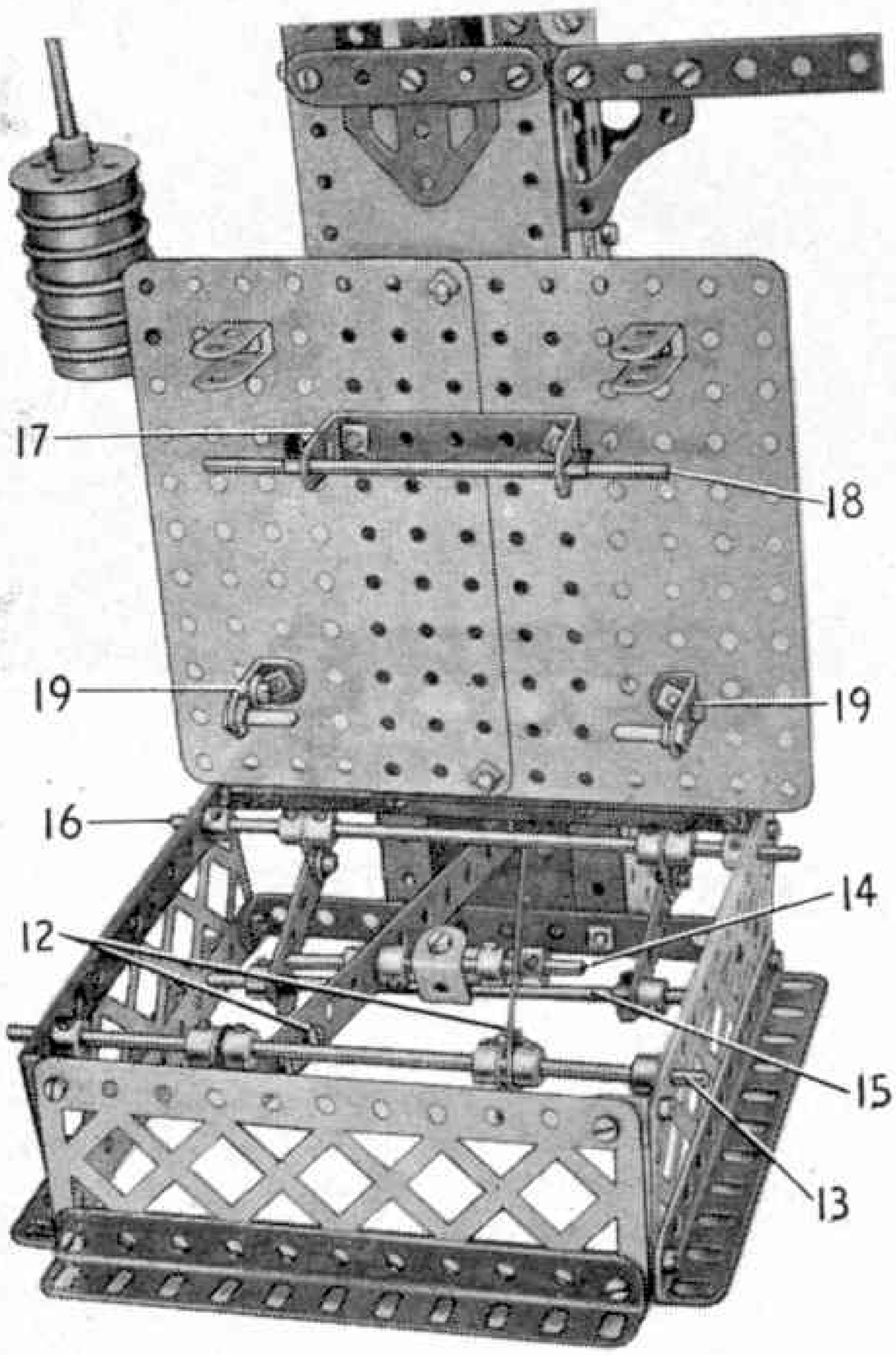


Fig. 3. The interior of the base showing the platform lever arrangement.

the framework.

Two Fishplates suspended from the Coupling 4 support a 1½″ Rod 11 held in place by Spring Clips. A Hook on this Rod is connected with levers 12 in the base by a length of Sprocket Chain and a second Hook.

The levers 12 consist of 5½″ Strips extended by 1½″ Strips overlapped two holes. They are pivoted by two Fishplates held in position on the Rod 13 by Collars. A 3″ Rod 14 is journalled in the Strips 12 and is linked to the Rod 15 by a Double Bracket fitted with a ¾″ Bolt. Two further levers consisting of 2″ Strips are attached to the ends of the Rod 15 and pivoted to the Rod 16 by Fishplates. This arrangement of levers ensures that a weight placed in any position on the platform produces an even pull on the Sprocket Chain.

The platform is made from two 5½″ × 3½″ Flat Plates overlapped one hole. A 2½″ × 1″ Double Angle Strip 17 carries a 4½″ Rod 18 retained in place by Spring Clips. Two 1″ × ½″ Angle Brackets 19 are spaced from the platform by four Washers and each carries a Threaded Pin. When the platform is in position the Rod 18 bears on the levers 12 and the Threaded Pins on the 2″ Strips forming the second pair of levers. Two Single Bent Strips fit over the Rod 13 and provide a guide for the platform.

The Strip 1 is fitted with a sliding weight formed by a Slide Piece. A Pawl 20 is attached to this by a ¾″ Bolt, and indicates the weight of the load on the calibrated scale 21. This scale is cut from cardboard and is bolted to a 9½″ Strip. An arrow-shaped piece of cardboard 22 is attached to the Strip 1 by a Reversed Angle Bracket so that it is exactly opposite a line on the indicator 23 when the steelyard is horizontal.

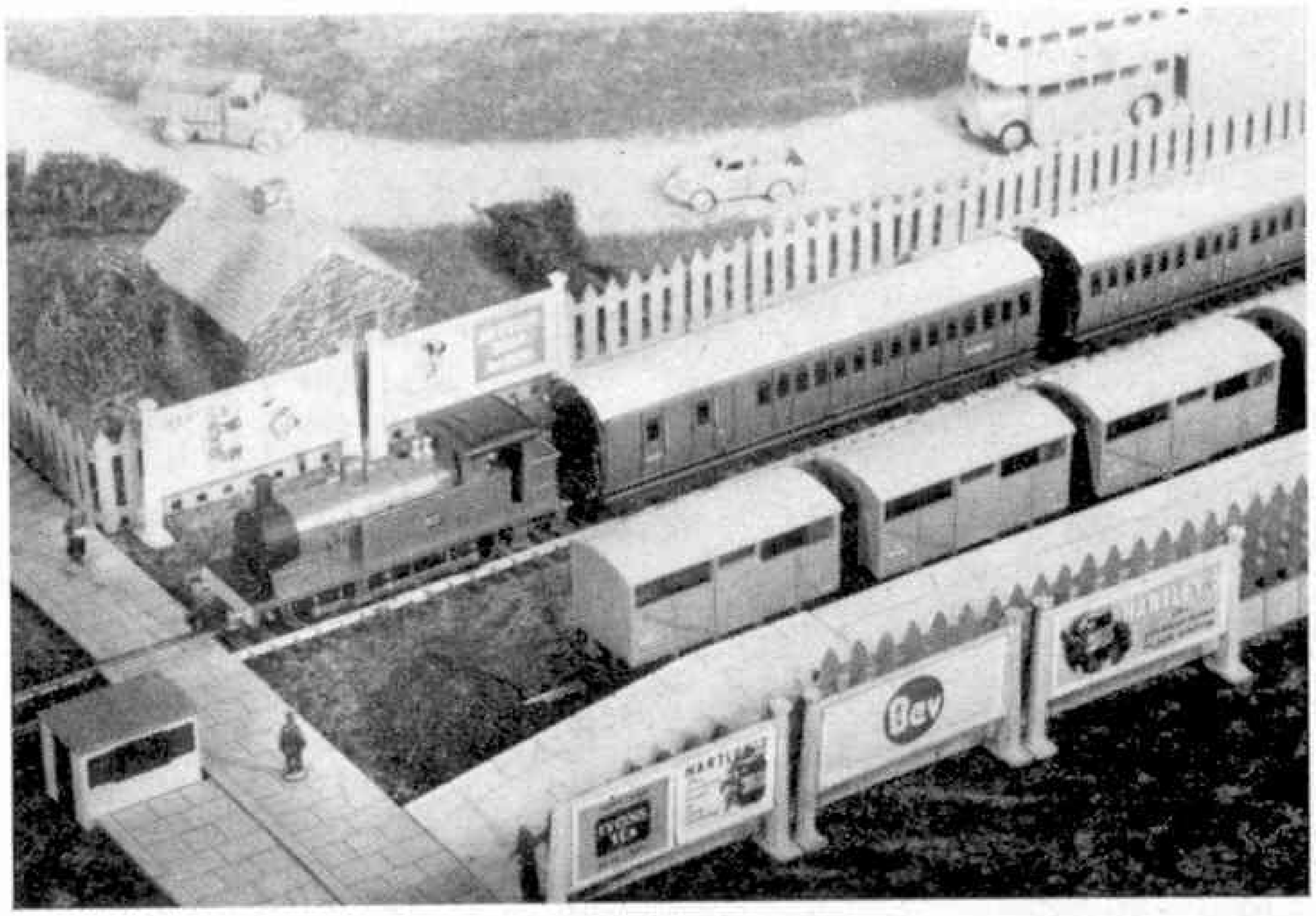
The steelyard is lifted into weighing position by replacing the Rod 9 under the Reversed Angle Bracket 10. When the scales are complete, the steelyard should be balanced carefully by moving the weight and minute adjustment made by means of the Threaded Coupling 6 until the arrow 22 is exactly on the line on the indicator 23 when the sliding weight is in its innermost position.

To graduate the scale, known weights are placed on the platform, and the sliding weight 20 is moved along the steelyard until the arrow 22 points once more to the line on the indicator 23. The position of the pointer should be noted on the scale in each case, and the magnitude of the weight marked against it.

Parts required to build model Platform Weighing Machine: 1 of No. 1; 3 of No. 1a; 2 of No. 2; 2 of No. 3; 4 of No. 4; 4 of No. 5; 2 of No. 6; 8 of No. 6a; 4 of No. 8; 4 of No. 9; 1 of No. 9d; 9 of No. 10; 1 of No. 11; 2 of No. 12b; 2 of No. 13; 2 of No. 14; 1 of No. 15; 1 of No. 15a; 1 of No. 15b; 2 of No. 16; 1 of No. 17; 1 of No. 18a; 6 of No. 20; 2 of No. 26; 8 of No. 35; 78 of No. 37; 22 of No. 38; 2 of No. 44; 1 of No. 46; 2 of No. 48; 4 of No. 48d; 1 of No. 50; 2 of No. 52a; 1 of No 57b; 1 of No. 57c; 20 of No. 59; 2 of No. 62; 7 of No. 63; 2 of No. 63c; 1 of No. 65; 1 of No. 81; 1 of No. 94; 3 of No. 115; 2 of No. 125; 4 of No. 126a; 2 of No. 136a; 1 of No. 139; 1 of No. 139a; 1 of No. 147c; 1 of No. 188; 3 of No. 189; 1 of No. 190; 1 of No. 191; 2 of No. 192; 2 of No. 214.

HORNBY
RAILWAY
COMPANY

By
the Secretary



Two-Rail Points and Schemes

SINCE we had our last talk I expect that many of you have had the opportunity of examining the Hand-operated Two-Rail Points that became available during last month. Before saying something about these and the schemes that they make possible I must point out that so far only Hand-operated Points have been distributed, but Electrically-Operated Points in Two-Rail will be ready soon, and we shall have to talk about those when the time comes.

The demand for Points, as for all the new Hornby-Dublo Two-Rail introductions, has been and continues to be tremendous, so that some shortages have been inevitable, but I hope that soon there will be plenty of Points, and of all the other good new things.

Those of you who already have Two-Rail Train Sets or Locomotives will be familiar, I expect, with the various diagrams that appear in the instruction booklet provided. Two of these relate to Points, and it is important to remember that the current is fed to the track at the toe end of Points, that is the end where the moving switch rails are situated. Of course the Curved Terminal Rail that feeds the current to the track does not have to be next to the Points themselves; in fact layout requirements frequently mean that the Terminal Rail is some distance away.

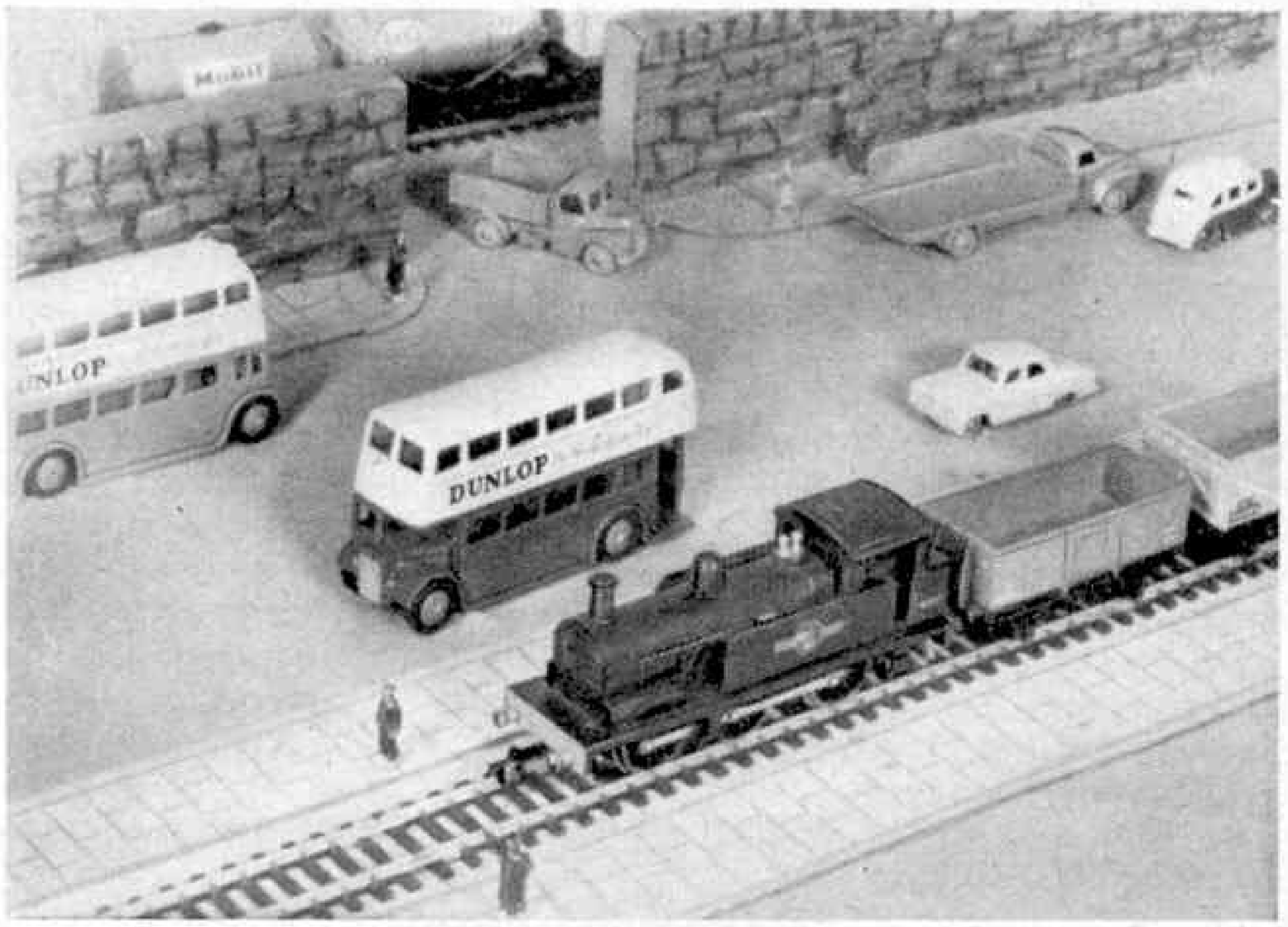
All the Two-Rail Points are isolating switch points, which means that current is led only to the route for which the switch rails are set. The necessary connections are built in, and are accommodated in a small casing situated at the straight side of the Points. The handle for Points operation projects through a slot in this casing.

Above is a rural scene in miniature with a Hornby-Dublo Two-Rail 0-6-0 Tank hauling a passenger train. A line of Cattle Wagons stands alongside the near platform in a realistic manner.

The addition of Points is an early requirement in the development of any railway system, and as a rule the first thing that the Hornby-Dublo owner does with them is to form sidings. If there is just a single siding no special isolating arrangements in the siding are necessary, the movement of the switch rails of the Points themselves ensuring that current is cut off from the siding when the switch rails are set for the straight road, which is usually the main line, and vice versa.

On a continuous track, such as the popular so-called oval, two examples of which appear on the back of the Two-Rail

locomotive instructions booklets mentioned, it is necessary to provide insulating gaps in each of the running rails on the main track in order to prevent conflicting currents at the Points, the Hornby-Dublo Two-Rail Points being arranged on what is known as the "live frog" principle. In order to provide the necessary gaps there is a Double Isolating Rail in the system, this being $5\frac{3}{4}$ in. long or two-thirds of the length of a standard Straight Rail. No terminals and no switches are needed, the double gapping afforded by this special rail being all that is necessary.

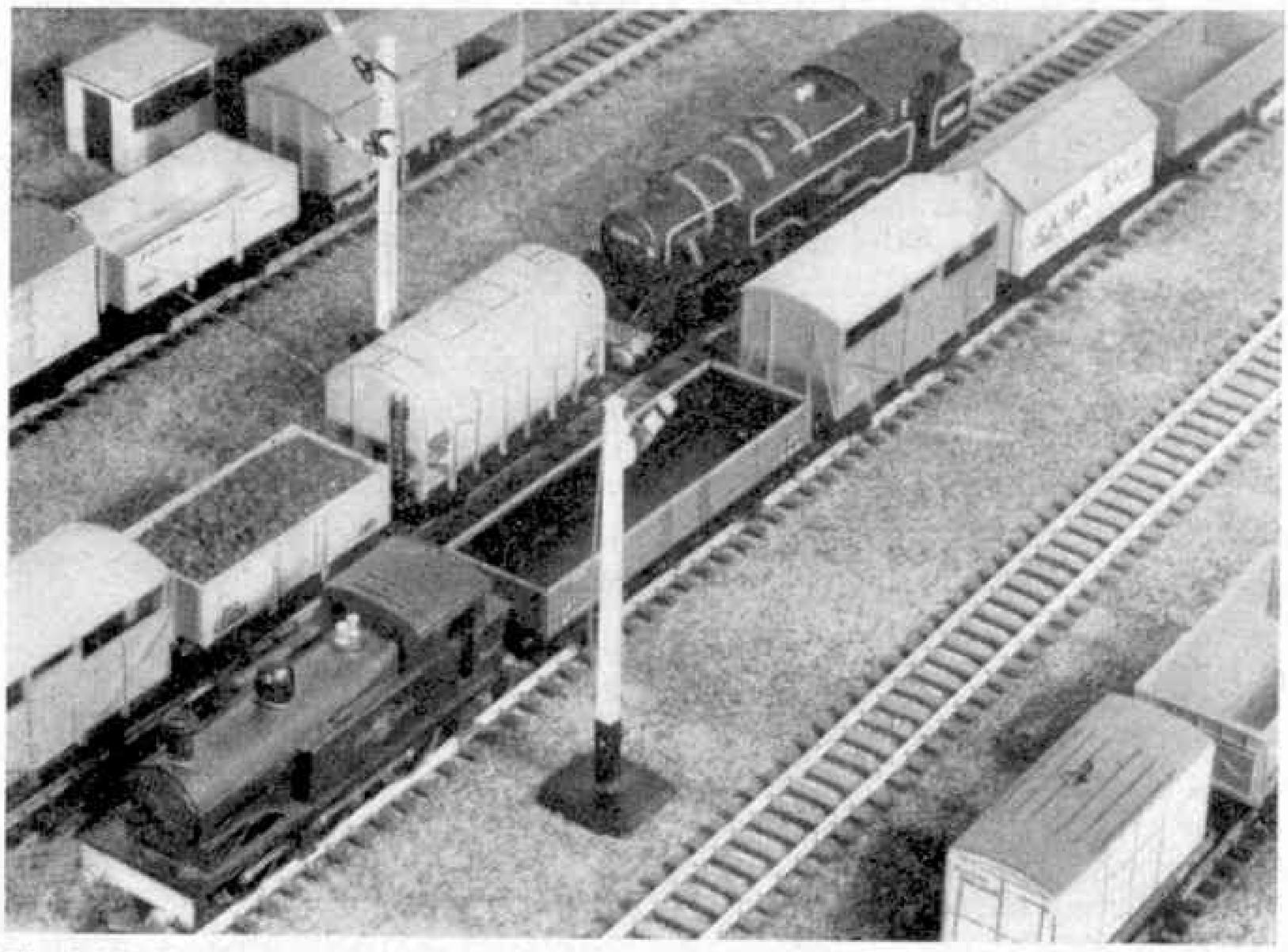


"The Dock Road" might well be the title of this view, with the 0-6-0 Tank cautiously making its way along the track parallel with the roadway. The goods yard "over the road" suggests further activities.

Naturally this Double Isolating Rail, and the corresponding Single Isolating Rail, which has an insulating gap in one rail only, have become available at the same time as the Points. The Single Isolating Rail has the same length as the double one, but it includes terminals, one connected to each section of rail on either side of the gap. With the terminals connected to a D2 Switch it is possible for us to divide a layout into separate sections, each of which can be made alive or dead as required.

We must have another talk about isolating schemes and track arrangements generally, but before passing on to one or two other recent introductions I should like to say something about terminals used on Two-Rail Terminal Rails, Points, and the Single Isolating Rail that we have just been talking about. These are of what is known as the spring loaded type. To make a connection with one of them the spring button on top of the terminal is pressed down. Two clear ways through the body of the terminal open, and the bared end of a connecting wire can be passed through either. When the finger is removed from the spring button the wire is gripped firmly.

Two new Hornby-Dublo Tank Wagons must be mentioned. They are respectively the I.C.I. Chlorine Tank Wagon and the Esso Fuel Oil Tank Wagon. More about them later!



The 0-6-0 Tank approaches with a mixed freight, including a Tube Wagon next to the engine. The 2-6-4 Tank is travelling bunker first the opposite way.

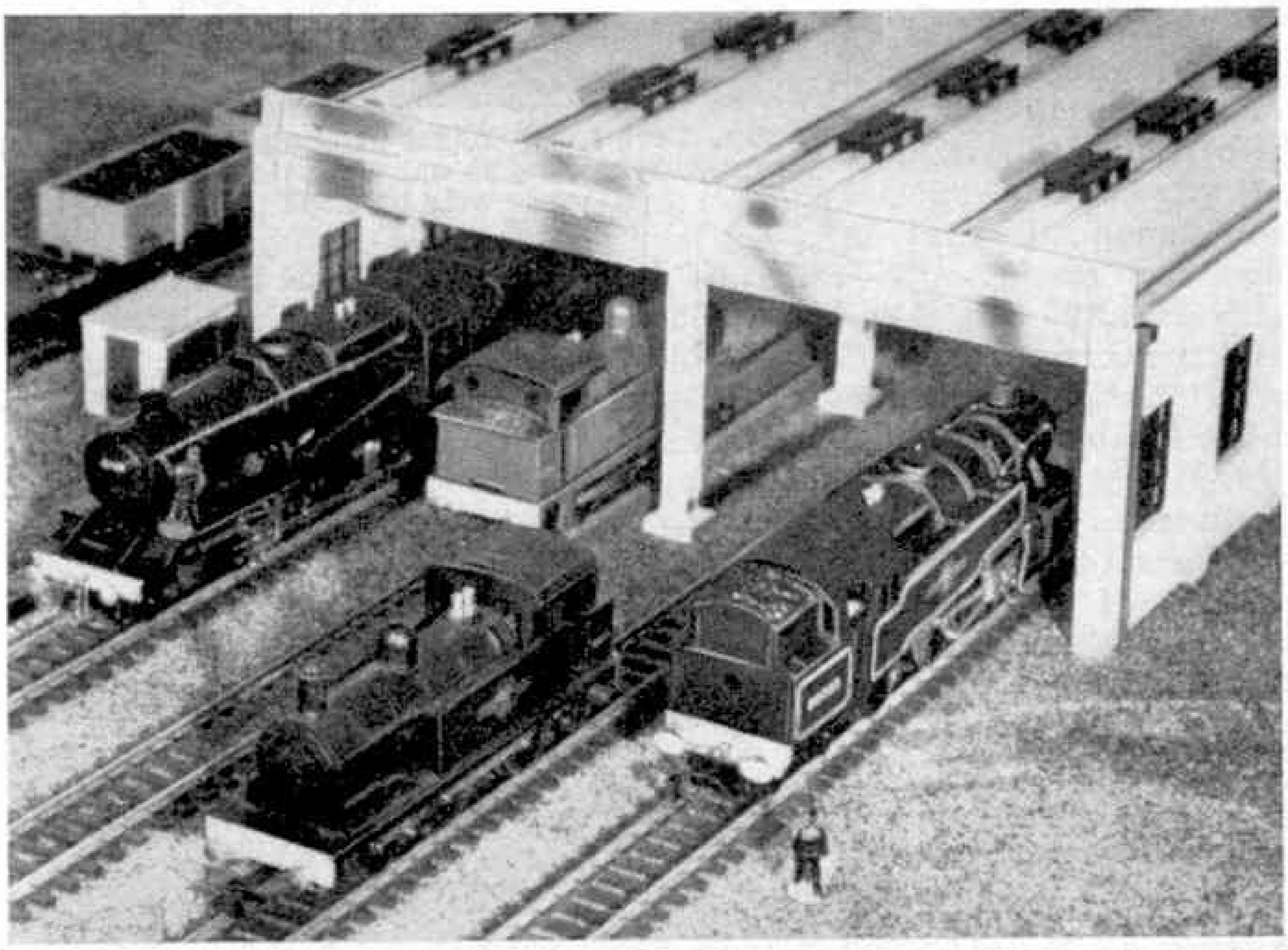
More Moulded Kits in Hornby-Dublo

By "The Engineer"

IT is now very easy to enlarge your Engine Shed as you increase your locomotive stock. The Hornby-Dublo Engine Shed Extension Kit is just the thing for doing this, as I am sure you will agree when you look at the double Engine Shed in the picture on this page. It is obviously a steam shed, as the presence of the smoke jacks on the roof indicates, and the realism is improved by the "smoky patches" cunningly placed over the tracks.

You can of course go further, and build up Engine Sheds with six or even more roads, each Extension adding on a two-road unit. I imagine that a four-road shed for passenger locomotives with, perhaps, a two-road shed for goods engines would make a suitable combination for most layouts and it will be easy to ring the changes if you build up a bigger or different layout.

By the way, just note the Platelayers' Hut. This is a useful little building to put down in such a position as it occupies, or to set up as an outside office or cabin for the staff who have to watch, record and control the movements of engines within shed limits.

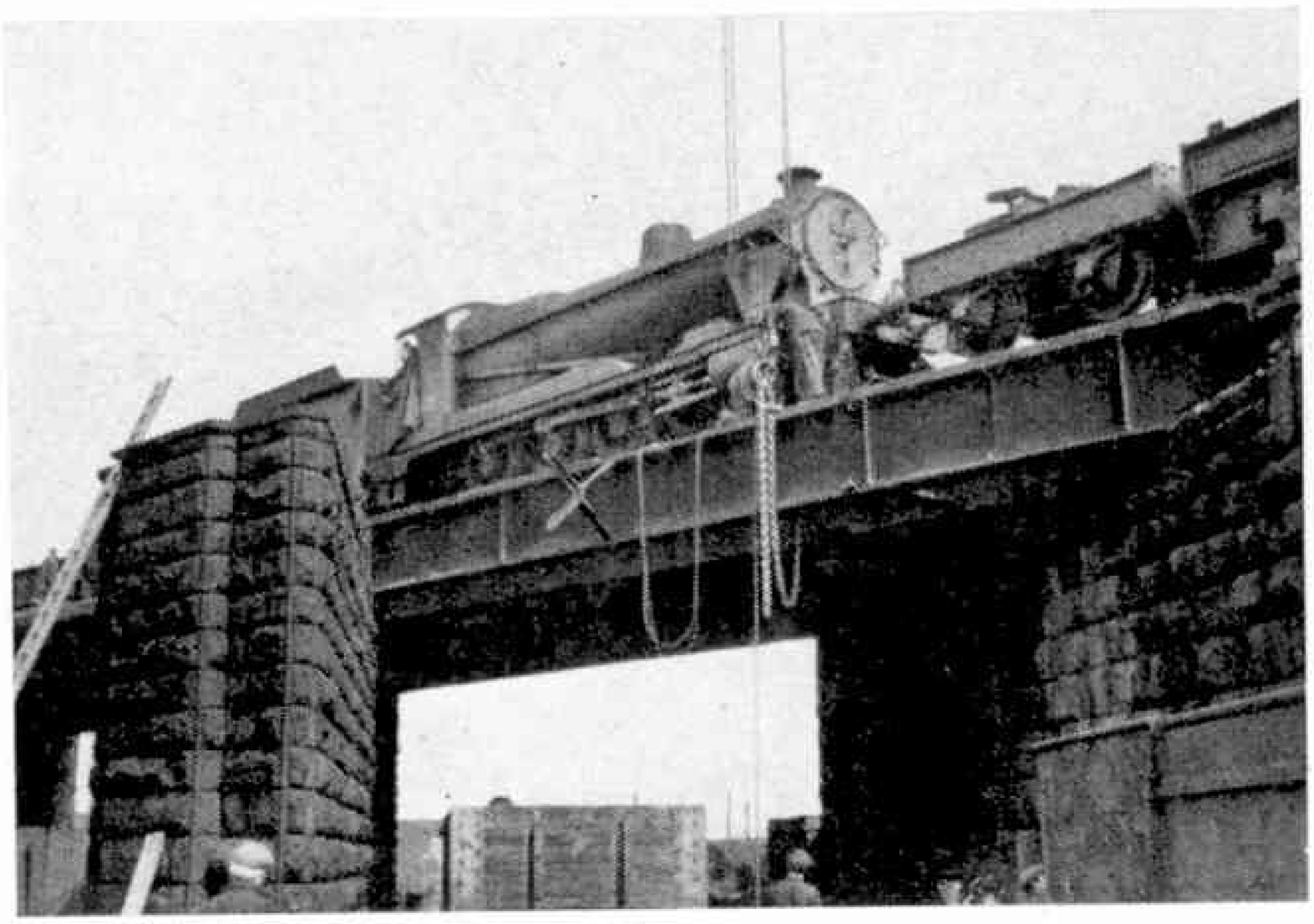


A four-road engine shed completed by means of the standard two-road and extension Kits. A useful selection of two-rail engines is on view.

Your engine shed premises should possibly be the place where you keep the Breakdown Crane, if you are lucky enough to have one of these splendid pieces of equipment. It is one of the most popular items added to the Hornby-Dublo System for use in either Two-Rail or Three-Rail, in recent years. You would need a four-road or even a six-road shed to keep it in, as is usually done with real ones, but if not you will have to park it in the open, as shown in the lower illustration on the next page. The crane looks remarkably effective in the background of this scene and you will notice that a brake second Suburban Coach is coupled up to represent the riding van for the breakdown gang, and for the guard who must accompany the train when running on a main line. In addition there is a long wheelbase Ventilated Van, representing the tool van that always forms part of the full-size breakdown crane assembly.

Although the name breakdown crane suggests that this appliance is used for dealing with mishaps, which is indeed its primary purpose, the powerful cranes now in service are often called upon for heavy lifting in connection with track relaying, bridge repairs and similar engineering work. Real breakdown cranes are wonderfully versatile affairs, and so, of course, is the Hornby-Dublo Breakdown Crane. What the breakdown cranes can do is shown by one removing the girders of a bridge being demolished, in the accompanying picture by our contributor K. Field.

The Engineering Departments of many Hornby-Dublo layouts are no doubt busy just now, particularly on those Two-Rail systems that are in course of being built up.



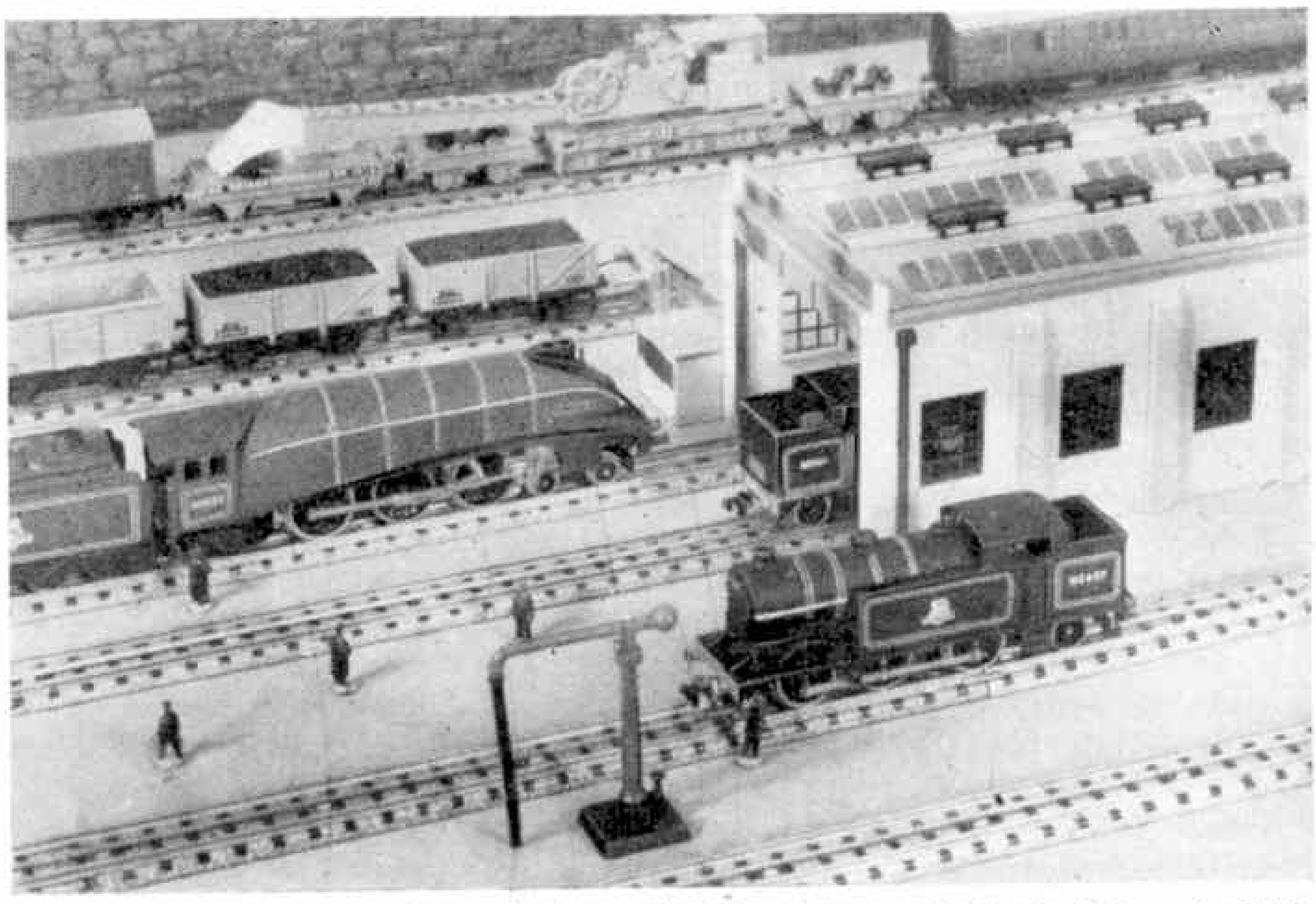
On real railways bridge work often calls for the use of a breakdown crane, as in this picture. One of the relieving bogies of the crane concerned is seen next to the engine. Photograph by K. Field.

Two further Kits of moulded parts recently made available are of special interest in this connection. These are respectively listed as No. 5030 Island Platform and 5085 Suburban Station Moulded Kits. The components of these maintain the high standard provided by the Engine Shed Kit, and the assembly of the different parts is clearly shown in the instructions leaflets that go out with both Kits. Do not think there is much work involved in assembling the parts included in any of these Kits. Full instructions are given, with sketches, and it really takes only a few minutes to build any item.

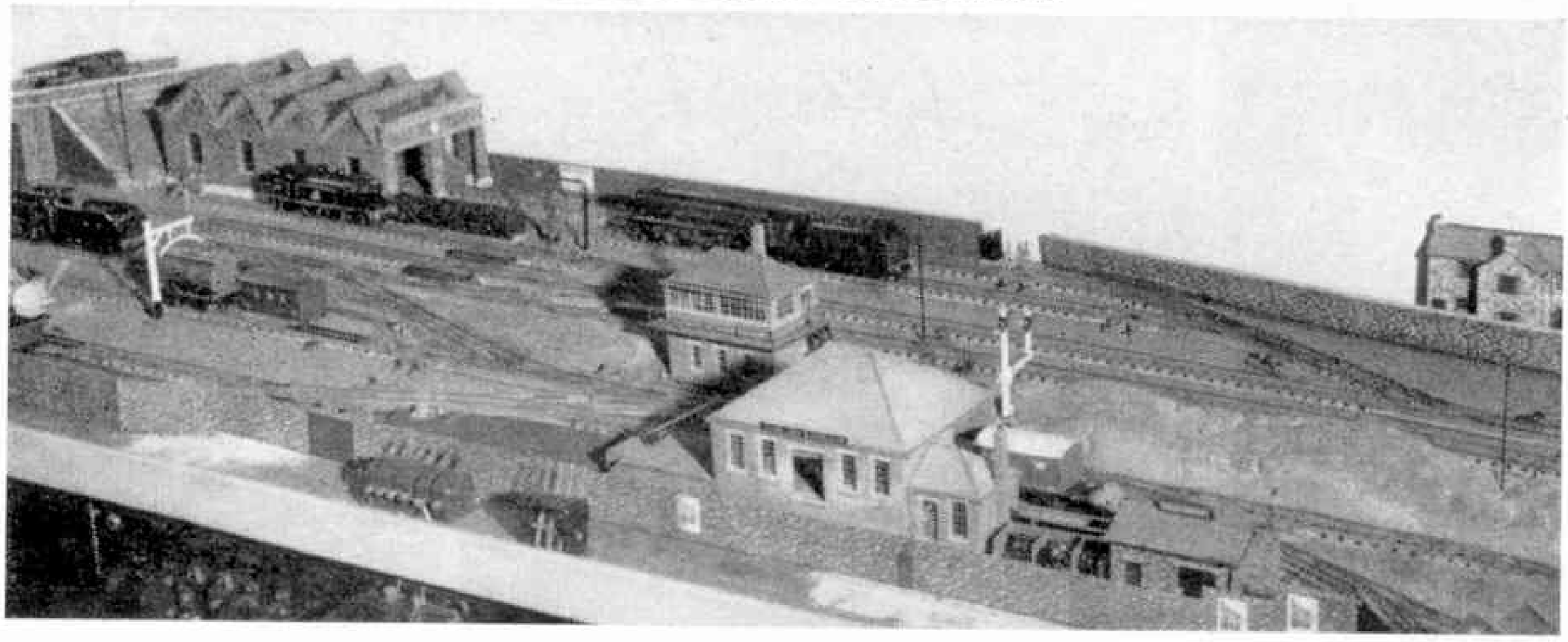
You will recall that when dealing first with the two-road Engine Shed Kit I drew attention to the fitting of the screws that secure the side walls to the roof. They are used in a similar manner on the suburban station. These screws fit into special sockets made so that they are expanded slightly as the threads of the screws make their way into them. It is a good plan when assembling one of these Kits for the first time to fit the screws into the sockets and screw them up, and then remove them before they are actually used to hold the roof in place. The important thing to remember is that the screws must hold things tightly together, and so you must avoid any temptation to ease them or the sockets by means of any tool.

The Island Platform and the Suburban Station assembled from these Kits are very attractive, for the moulding throughout is excellent in character, the reinforced concrete construction that is used for so many purposes nowadays being accurately suggested. In each case the platforms are arranged in three parts, a main centre section and two end pieces including the sloping ramps. On the centre section of the Island Platform is an awning of modern form, centrally supported.

The platform section of the Suburban Station is entirely clear, the station building being set back behind it. The roof slopes slightly and projects in front of the building.



The Breakdown Crane waits, ready for action if called upon, in the background of this Hornby-Dublo two-road shed scene.



Two Good Ones!

By "Layout Man"

I HAVE two more good Hornby-Dublo layouts to tell you about and I am sure that these, parts of which are shown in the accompanying illustrations, will be full of interest for you. Our pictures are all the better because two of them show the owners of these layouts. As has been remarked before in these pages, it is always nice to know what our correspondent friends look like.

On this page and the next is featured the extensive system of Mr. C. R. Hartley, of Bradford, in which the track system appears to incorporate practically all the Hornby-Dublo rail components, except the Diamond Crossings.

Above is shown the engine shed and goods yard on the Hornby-Dublo layout of Mr. C. R. Hartley, Bradford. This and the two illustrations on the next page are from photographs by W. Hubert Foster.

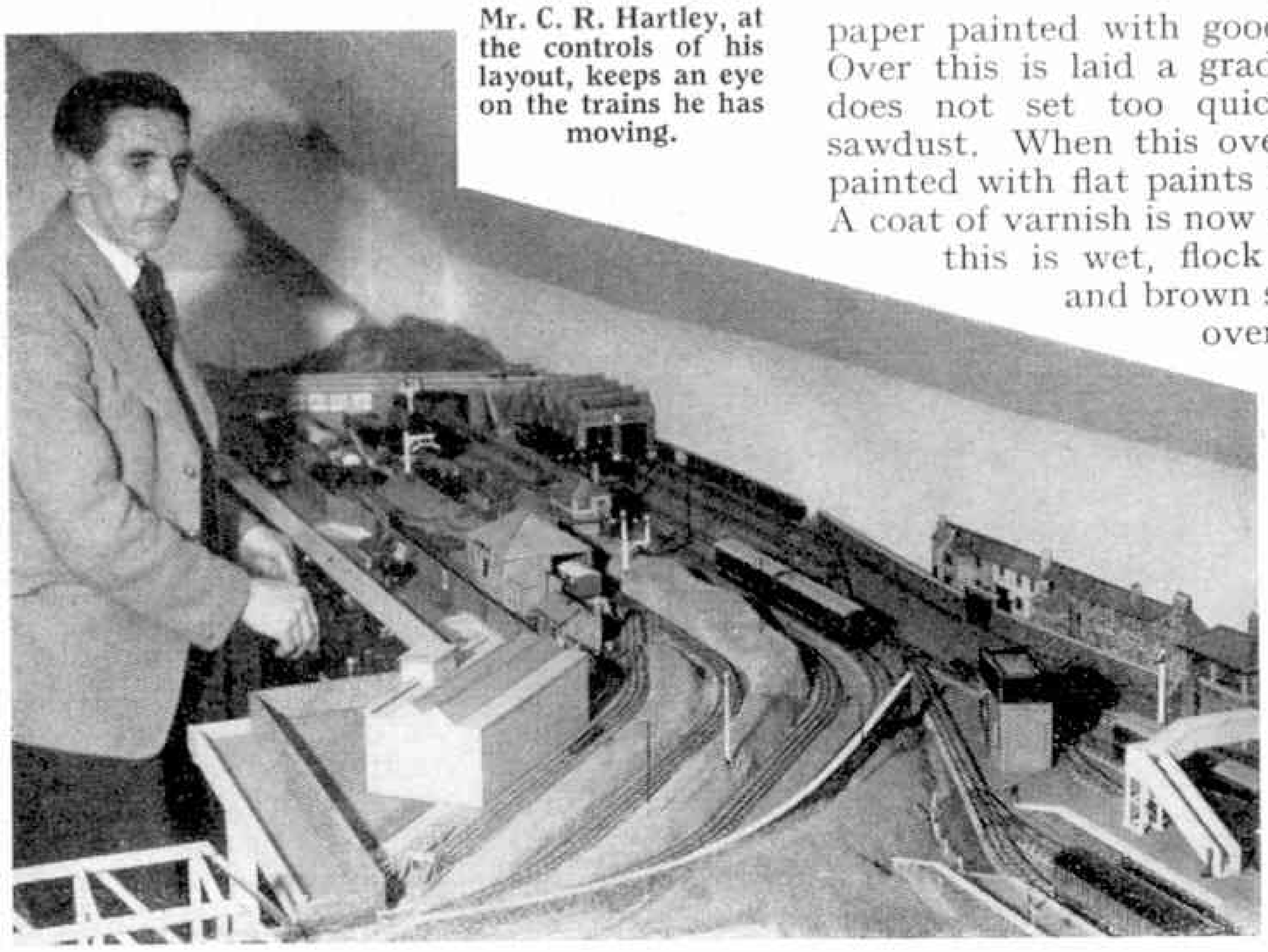
The baseboard for the track is substantially arranged. Apart from the necessary strength and good level characteristics, special care has been taken to obtain a neat appearance and finish. This is clear in the illustrations, two of which show the finishing strip that is run along the edges of the baseboard itself.

The general shape of the railway may be compared somewhat broadly to that of a capital letter "P", the down stroke being represented by part of the continuous main line and the extension on which a terminal station is situated. The rest of the letter is formed of the double track main line which has connections to a goods yard, various sidings and the factory building that is prominent in the upper illustration on the next page.

The corner where this building is situated and that diagonally opposite are not symmetrical, but this breaks the monotony usual on the average oval track and in each case the formation takes the fullest advantage of the baseboard space available. The corner that is opposite to the factory section is shown in the lower illustration on the next page and you can just see that this incorporates a reverse curve, part of which is in the tunnel section that is built up hereabouts on the railway.

In addition to the terminal station section, the longer side of the layout incorporates a locomotive siding and an engine shed, the sawtooth roof of which readily identifies the building. A coal stack and Water Crane are provided to look after the needs of the locomotives and these two simple features add a good deal to the effect of the Locomotive Department premises generally.

At the back end of the engine shed is a road overbridge and this marks the beginning of a raised section of "ground" on which the usual features of a suburban district occur. By degrees the suburban area leads out to a more countrified section and it is through this that the tunnel referred to previously is driven. The roadway in the meantime turns at right angles to follow the track, crossing as it does so a single line loop connection that provides a ready means of reversing trains on the inner main line. You can see this track curving under the bridge on which



Mr. C. R. Hartley, at the controls of his layout, keeps an eye on the trains he has moving.

there is a Dinky Toys Double Deck Bus in the lower illustration on this page. Then the road, now quite countrified, drops to track level and turns again to a level crossing over the main line. It disappears "off stage", so to speak, through some scenic features in a convincing manner, not always an easy thing to arrange.

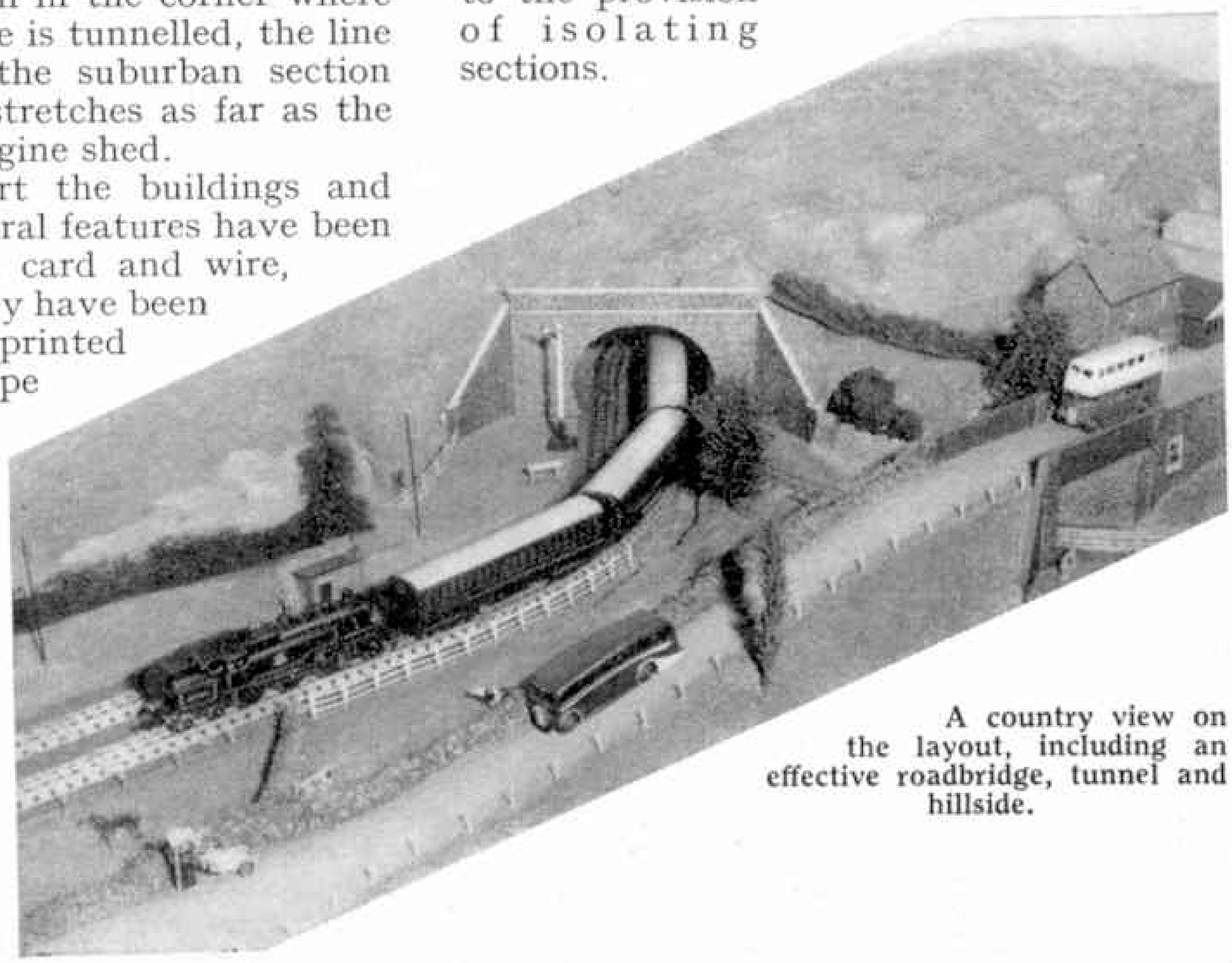
Although the suburban district mentioned before is raised above the level of the main line at one end of the layout the railway is not carried in tunnel throughout this section. Only the hill in the corner where the reverse curves are is tunnelled, the line being carried past the suburban section into a cutting that stretches as far as the overbridge by the engine shed.

For the most part the buildings and various other structural features have been built up with wood, card and wire, and in some cases they have been finished off with printed brick papers of the type familiar to most miniature railway enthusiasts.

What I may call the landscaping is very effective, but it consists of nothing more formidable than basic shapes of newspaper rolled into balls, these in turn being covered by stiff brown paper painted with good thick oil paint. Over this is laid a grade of plaster that does not set too quickly, mixed with sawdust. When this overlay has set it is painted with flat paints of various shades. A coat of varnish is now applied and, while this is wet, flock powder of green and brown shades is scattered over it in patches as required.

These materials used will be familiar to most miniature railway owners of the "Do-It-Yourself" persuasion, but I think that my younger friends should seek help in this type of operation or at least get a little practice first with the different processes before attempting the job itself. Permission to carry out operations of this kind is certainly one of the things that should not be neglected!

Traffic is operated in a regular manner by means of various timetables, and movements can be carried out over a long period without repetition. Many alternative workings are possible, and a fine degree of flexibility in working is obtained because of the special attention that has been given to the provision of isolating sections.



A country view on the layout, including an effective roadbridge, tunnel and hillside.

Hornby-Dublo Electrically-Operated Points are used throughout and for the most part the signals are Hornby-Dublo ones of the electrically-operated type. Controls are located beneath baseboard level, although there are several banks of switch levers on the baseboard itself. It is clear, from the picture in which Mr. Hartley appears that the operating position has been chosen with care, for a clear view of the whole of the terminal is provided.

There is plenty of scope for practically all the miniature railway skills, but as usually happens on most layouts changes are contemplated. These will rather take the form of extensions, for an additional

John Mason, Ruislip, busy with his Hornby-Dublo layout, on which a large number of realistic operations is possible.

baseboard level is being provided on which the track system will be carried out in Hornby-Dublo Two-Rail and it will of course be worked by appropriate locomotives. This is the sort of extension scheme that many Hornby-Dublo owners appear to have in hand or are at least considering at present. It enables them to continue to enjoy their Three-Rail systems and yet they can provide further developments by means of a separate Two-Rail section. Of course the engines are not interchangeable between two such main sections, but all Hornby-Dublo rolling stock of recent production with moulded wheels is, as you know, suitable for running on Two-Rail or Three-Rail layouts.

Last month you saw part of the second layout that I have to talk to you about, but here we are fortunate in being able to include the owner himself, John Mason, of Ruislip, clearly intent on his train operations when the picture was taken. This railway began as a portable one, but it has been in existence on a permanent baseboard for about 18 months and a very satisfactory degree of progress has been achieved. This again is a railway with numerous lineside features, generally in the form of buildings although at the right hand end of the picture part of a lineside hill can be seen in the illustration. This fills one of the corners of the layout board quite nicely.

Here again we have a terminal-and-continuous type layout combined, at least so far as goods traffic is concerned. Passenger trains have the main line on which to perform and they are dealt with adequately at the three-platform station situated just in front of the operator. As noted last month this consists of a Hornby-Dublo Through Station and an Island Platform with extensions.

The layout is arranged on a baseboard 8 ft. × 4 ft. and the owner has done very well to include the many interesting features that add to the convenience and fascination of train working. Space restrictions cause the locomotive yard layout to be somewhat cramped, but the Hornby-Dublo Turntable is installed in such a manner that what is really one of the outlet tracks is used to lead engines on to the Turntable, from which they are reversed into any of four other roads.

Control arrangements are very complete, with independent working possible on the inner and outer main tracks. Special switching arrangements provide for a good deal of flexibility in working. It is clear that the development of this layout has provided the owner with a great deal of entertainment and pleasure. I know that train movements have been well in mind when the various siding loop and isolating sections have been devised, which is as it should be.

Club and Branch News

WITH THE SECRETARY

INCREASING THE MEMBERSHIP

I wish all members of the Guild and H.R.C. a very happy and prosperous year in 1960. I hope that it will be one of good progress in both Clubs and Branches, with encouraging increases in membership. This is the time of year to recruit new members from the many thousands of new Meccano and Hornby Train enthusiasts who have been brought into being as the result of receiving Meccano Outfits or Hornby Train Sets as Christmas presents.

Who and where are these possible new members? This is where the Club or Branch Secretary comes in, for he can arrange to have a neatly printed or typed advertisement of the Club or Branch displayed in the window or shop of every Meccano dealer in the town, or in the case of School organisations on the School notice board. Each Club or Branch member himself can help by bringing into membership any of his friends who have just become owners of Meccano Outfits or Hornby Train Sets, and are as yet unaware of the increased enjoyment they will find in joining with others in their new hobby.

MECCANO CLUB RECENTLY AFFILIATED

City of Exeter M.C.—*Leader:* Mr. H. Lyon, 71 Birchy Barton Hill, Exeter.

CLUB NOTES

Borden Grammar School (Sittingbourne) M.C.—A Meccano model-building competition resulted in some excellent entries. Film Shows continue to be popular. The highlight of a recent Trains Evening was a "running" competition in which members had to operate a train for two complete circuits of the Club track, stopping and starting the train smoothly and quickly in the station. Skilful operation was called for, and the contest proved very exciting. *Secretary:* B. L. Sedge, 19 Cavour Road, Sheerness, Kent.

North End (Portsmouth) M.C.—The Club and the associated H.R.C. Branch put on a splendid display at a recent Bazaar held in the Eastney Central Hall and organised by the Rev. Peacock. The display was accommodated in a separate room, and the charge of 6d. for adults and 3d. for children resulted in £5 being raised for the Church funds.

A recent General Meeting discussed an Exhibition to be held this month, the Tenth anniversary party next February, and a big Exhibition planned for next August. R. Scutt has been busy constructing a 6 ft. long model destroyer, which will have working turrets of his own design. The model is to be completed in time for the August Exhibition. *Secretary:* Mr. A. J. Nicholson, 213 Sultan Road, Buckland, Portsmouth.

BRANCH NEWS

Kidderminster Model Railway Club.—Mr. Gerald Nabarro, M.P. for Kidderminster, was elected President of the Club at the opening meeting of the Club's sixth winter session. In the course of his cheery speech he mentioned that two attics in his home are used by his sons for model railway activities. Mr. Mather is making very good progress with the development of the Club layout, to which a high level section has just been added. It is hoped to have the layout finished early in the New Year, when an Exhibition will be held. *Secretary:* J. T. Hill, 15 Almond Avenue, Franche, Kidderminster, Worcs.

North End (Portsmouth).—Recently a local furniture removal firm asked the Branch to repair, for one of their customers, a Train Set which had been damaged during removal operations, and this was ably done. *Secretary:* Mr. A. J. Nicholson, 213 Sultan Road, Buckland, Portsmouth.

NIGERIA

Gindiri Secondary School.—Members have been busy making stations, tunnels, and other scenic features for the Branch layout. *Secretary:* Paul M. Thahal, Gindiri Secondary School, Sudan United Mission, P.O. Barakin Ladi, via Jos, N. Nigeria.

The fascination of model railways is as great as ever. These youngsters are watching with keen interest train operations on a layout at the joint Second Annual Exhibition of the North End (Portsmouth) M.C. and H.R.C. Branch last year. Illustration by courtesy of the "Portsmouth Evening News".

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Stamp Collectors' Corner

By F. E. Metcalfe

THE BLACK REPUBLIC

How well I remember the first triangular stamp I ever owned, when I was still at school. Even then a "Three-Cornered Cape" was beyond the reach of a schoolboy, but Liberia came to the rescue and for about twopence I was able really to confound fellow junior collectors with a pukka "Three Corner."

I remembered all this when, years later, coming back from Zanzibar, via the Cape, the ship in which I travelled called at Monrovia, Liberia's capital. I was able to have a run ashore, and to see how very little had been done to make the progress its founders had hoped for. That was, of course, just after the first World War. Since then there has been advancement, particularly since President Tupman took over in 1943.

Almost 140 years ago, when James Monroe was the President of the United States of America, a band of American ex-slaves set off for the African west coast to found a new republic. Apparently they only settled on the coast, mixing very little with the real natives in the interior.

Things went badly at first, and indeed it was only when foreign capital took a hand, and firms like the Firestone Rubber Company set to work making rubber plantations, that any real progress was made at all. Now Liberia exports not only rubber, but iron ore also in huge quantities. Monrovia today is really a good port.

Now if the country itself is not exactly of the most colourful kind—perhaps it is no worse for that—its stamps are anything but dull. Nowadays the stamps of many countries are designed to catch the public eye, but there was a time when Liberia was one of the few that provided young collectors, at least, with cheerful philatelic fare.

For many years the attractive stamps of Liberia were quite expensive at first, for the currency of this African country is based on that of the U.S.A., and with postal use relatively small, used stamps were as scarce as mint. That is why they were expensive. But later, when a new issue appeared, stocks of the obsolete issue would be cancelled, and put on to the market at a low price. This has had the effect of lowering the status of Liberian stamps, as far as advanced collectors were concerned. But the move has been welcome to juniors, for they have thereby been able to make quite a nice show for very little cash. Naturally these obliterated stamps have not gone down very well with those who had paid big prices earlier on, and it must be admitted that with the exception of the early issues, the standing of Liberian stamps in general has not been high.

It is now almost a hundred years since Liberia issued its first set of stamps. Although the stamps of the "Black Republic" emitted nowadays are not popular with advanced philatelists, this state of affairs does not apply to the first issue, or those that followed during the next twenty years or so. The first set was actually printed in London, by the lithograph process, and very crudely, but the fact that the first three imperforate stamps are catalogued at £12 each is proof enough that they are much sought after. This is particularly so in the U.S.A., where there is a sort of paternal feeling for anything Liberian. The same design, showing a seated figure rather like Britannia with a trident, was in use for twenty years, and it is the various perforations and the different kinds of paper used that make the stamps so popular with philatelists.

The next issue was much smaller and consisted of a single 3c stamp, in black. You might be offered stamps printed in red, and told that these are proofs, but experts are now satisfied that they are merely forgeries, so be on the look out.

From 1882 onward there was a thick and furious flow of stamps, with designs ranging from a portrait of the then President Johnson to coats of arms and pictures of wild animals, which are to be found in Liberia in great numbers even to this day.

But of all the attractive and unattractive stamps that Liberia has issued, there is the one for which I, and no doubt many other old collectors, have a specially warm feeling. This is the triangular issue of 1893, the one that became a proud possession for me.

With post offices bringing out, by the bushel, stamps of all shapes and sizes, what is there in a mere triangular stamp? Now they are three a penny, but it was very different when Liberia issued its first masterpiece. I like to think that my copy still reposes in some treasured collection, and may it give its present owner as much pride in its possession as it gave me, although it cost me only a copper or two. It is a fact that even today one can be bought for three or four shillings.

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For other Stamp Advertisements see also pages 48 and xx

Stamp Gossip

WANTING A CHANGE?

It is not so very long since I received a letter from a London collector expressing views that I have heard quite a bit lately in other quarters. So I will just quote a sentence or two, for I think there may be other *M.M.* readers who may be facing a similar problem.

My correspondent wrote, "I sold my general collection two years ago, when I realized that I could get nowhere going in for everything, and started two thematic collections. They gave me quite a bit of fun, though all the time I have felt that there was something lacking. I might just as well have been collecting cigarette cards, for it was only the designs of the stamps which were being considered. I am very interested in designs, and do not want to collect the stamps of a country with issues as dull as our own, but I also want more than designs, and plenty for my money. What do you suggest?"

I sent my enquirer a personal reply, agreeing that thematic collecting is jolly good fun, but is not in itself much more than that, with the technical side of the hobby—a side that makes it worth while for many—mostly lacking. But there are plenty of attractive stamps that also provide scope for indulging in the finer points of the hobby, the philatelic side.

For instance, what about modern France or Turkey, or Japan? For sheer beauty and novel designs the last-named country will take a lot of beating, and this was the one I suggested. He wrote again later, to say that after consideration he was taking my tip, for Japan seemed to have everything.

But a word of warning here! Leave the early issues of Nippon right out of it, for there are fakes and forgeries to beat the band, and so good are some of them—or should I, in the circumstances, say so bad—that they beat all but the very expert.

K.L.M.

These almost magic letters must be almost as familiar to readers as our own B.E.A., for you see them everywhere as the initials of that very wonderful Dutch airline which surprisingly enough actually celebrated its 40th anniversary on 7th October last. From the very beginning of commercial air transport, the air-minded Dutch have built up a service that is equal to the best, and the Dutch Post Office in issuing two stamps last October to commemorate this 40th anniversary honoured itself by so doing.

There are still people who prefer good old terra firma, but personally if I had only a mile to go I would go by air if possible. The airlines look after their passengers so well.

THE JUBILEE RARE SHADE VARIETY

Recently I got a letter from a Scottish reader who explained that he had read in a newspaper that a block of four of the British 1935 "Silver Jubilee" 2½d. stamps had sold for £230, and that though he had none of the same value, he had some of the other values of the same set. Then he asked if they were worth anything? The inevitable question!

The answer was, and I give it here, that even if my correspondent had some of the 2½d. value, it is not likely that they would have been of the same colour as the block that had made such a fancy price, for only one or two sheets of the latter were ever found. The difference arises from the fact that their colour was what has been called Prussian blue, not a particularly apt designation, while the normals are just blue.

There is quite a story, and a true one, attached to the finding of the abnormals. Apparently some sheets as a trial had been printed in a different colour from that of the stamps that were finally selected for release. In error, these were included in a batch for sale, and a collector noticed them in a London Post Office. He took a sheet to a very well-known stamp firm in the Strand. Not knowing whether the stamps would prove common or scarce, though it was obvious that the shade was different, the firm offered him 6d. a stamp. Alas, they did prove scarce, and of course the owner of the stamps would not sell at that price. Instead he sold to another dealer, and both he and the dealer no doubt did very nicely out of them.

So it is these "Prussian blue" 2½d. stamps which bring the high prices. The ordinary blue are not worth more than about a shilling or so each. Check up on all newspaper stories before accepting them as gospel, or else you may be disappointed, for some of them go very much astray on finds of this kind. For instance, some time ago a variety of little philatelic worth was reported by one newspaper to be worth about £1,000.

TIP OF THE MONTH

There was a good deal of overbuying after the war, and our own colonial stamps featured in the purchases, but postage dues stamps were more or less left alone because they were not at all popular. Now all that has changed since they were thoroughly catalogued in Commonwealth Catalogues. So, noting the trend, which is growing in intensity all the time, I am going to suggest this month that you take care to pick up any postage dues that come your way, at prices under present catalogue quotations.

Christmas Books and Others

GAMAGES 1960 BOOK OF MODEL TRAINS, SHIPS, AIRCRAFT, CARS, etc.

(GAMAGES Price 1/–)

The 1960 edition of this familiar publication gives comprehensive details of a wide range of products that will appeal to the transport enthusiast, whatever his particular interest may be. Miniature trains and railway equipment of various makes including, of course, Hornby-Dublo Two-Rail and Three-Rail, are listed in an attractive manner. There is a most useful section dealing with electrical matters, and the power supply and control units associated with miniature railway work. Accessories from various sources that suit almost any 00 gauge railway are shown and there is, in addition, a limited selection of gauge 0 railway stock.

Miniature aircraft, cars and ships are dealt with in a similar manner and the kit enthusiast will revel in the wide selection of plastic and other kits that are available for ready home construction.

Materials, paint and tools for various hobbies and handicrafts are featured, so that all told the book is a mine of information on the subjects that it covers. It is published by Gamages, Holborn, London E.C.1., at 1/– including postage

"TRAINS ILLUSTRATED ANNUAL 1960"

Edited by G. FREEMAN ALLEN
(Ian Allan Ltd. Price 10/6)

The popular *Trains Illustrated Annual* has once more made its appearance, and as in previous editions, the contents of the 1960 issue are nicely varied. The articles and photographic features extend in range from aspects of British Railways modernisation to ancient steam survivals in Spain, with such absorbing topics as the B.R. Class 9 2–10–0's, remarkable engines which have caused some pleasant surprises. A full coverage, with illustrations, of the recently closed and sadly missed Midland and Great Northern joint line is, perhaps, the highlight of this year's edition.

A study is included of the Beyer-Garratt, which in certain overseas countries is a popular and still much alive type of locomotive in a world of declining steam power. This latter trend, painful to many of us, is emphasised by another article dealing with the last steam days of the Kent Coast lines, now being electrified. There is much other good reading, and a selection of colour plates of British trains, modern and historical. The articles are also amply illustrated.

We feel sure that most railway enthusiasts will add this year's edition to their libraries, and copies of the Annual are obtainable at booksellers and railway bookstalls, price 10/6.

The Age of the Motorway

—(*Continued from page 4*)

junctions sometimes found on the Continent and in the United States, the keynote of the London/Yorkshire motorway intersections has been simplicity in design, using only the minimum of land for each fly-over junction.

By no means the least impressive feature of this enterprise has been the organisation and development by John Laing of the huge labour force involved. At the peak construction period some 5,000 men were engaged. Drawn mainly from other projects all over Britain, they were housed in hostels, lodgings and caravan parks. Fleets of buses conveyed them to and from the sites; canteens were set up at all site offices, and at 2½-mile intervals along the motorway; mobile canteens were also used.

Radio communications over the whole motorway have also played a vital part in speeding the work. Seven master short-wave sets and 80 subsidiary short-wave radios and field telephones have been used for mobile and static control, and also for calling up plant, plant spares and transport from the main depot at Boreham Wood.

Such has been the organisation behind one of the most spectacular and high-speed civil engineering enterprises yet seen in Britain. The construction of 55 miles of motorway, the large number of bridges, diversion of rivers, canals, gas, electricity and water supplies, interruption and rebuilding of railways, the laying of 17 miles of subsidiary and access roads, are all part of an achievement which, by any standard, can only be described as phenomenal.

From a management and supervisory point of view, the use made of the helicopter service has been outstanding. By no other means could Mr. Maurice Laing, Managing Director of the civil engineering contractors, and his senior colleagues have inspected in half a day the whole length of the motorway construction, consulted project managers and engineers at the four main sites, and still have been able to put in several hours' work at the Company's office in the West End of London.

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Mystery of the Moa

—(*Continued from page 34*)

look like? There is no doubt that they were of the same general appearance as their nearest neighbour, the emu of Australia. The skeletons of the twenty-five species indicate great variance in height and bulk. That moas were wingless and without tails is certain.

The feathers that have been collected show that the general colour and appearance of the plumage was very like that of the kiwi, which still lives in the remoter parts of New Zealand. Some of the moa feathers have a rufus tinge. It has been suggested that some, if not all moas, might have carried a head plume, but this, like many other details concerning the remote origin, habits, appearance and final extinction of this remarkable bird, still remains one of Nature's hidden mysteries.

Easy Model-Building

—(*Continued from page 25*)

two 1" Motor Tyres at each end.

Two Angle Brackets 6 are used to fix the two 5½" Strips 5 to the two 5½" × 1½" Flexible Plates, which are curved to form the roof and back of the cab. These two Plates are overlapped one hole and at their lower ends are held between the 5½" Strips 2 and 5. They are also bolted to one of the shorter flanges of the Flanged Plate 1. The 5½" × 1½" Flexible Plates are then curved at right-angles to form the roof, and are secured at their corners to two Angle Brackets 7 bolted to the upright members of the cab.

The sides of the cab are built up from two Flat Trunnions 8. A Curved Strip is bolted through its centre hole to the centre hole of each of the Flat Trunnions 8, and one end of each of the Curved Strips is bolted to an end hole of the longer flanges of the Flanged Plate 1. To the other end hole, a 2½" Strip is bolted, also by its end hole, and the bolt also passes through the lug of a Double Angle Strip 9. A second Double Angle Strip 10 is bolted to the centre holes of the 2½" Strips forming the uprights of the cab to which the roof is fixed by means of the Angle Bracket 7.

A 2½" Strip is used to form the window-bar at the front of the cab, and is bolted to the two Double Angle Strips 9 and 10. To this 2½" Strip a further 2½" Strip 11 is bolted horizontally between the two Double Angle Strips 9 and 10.

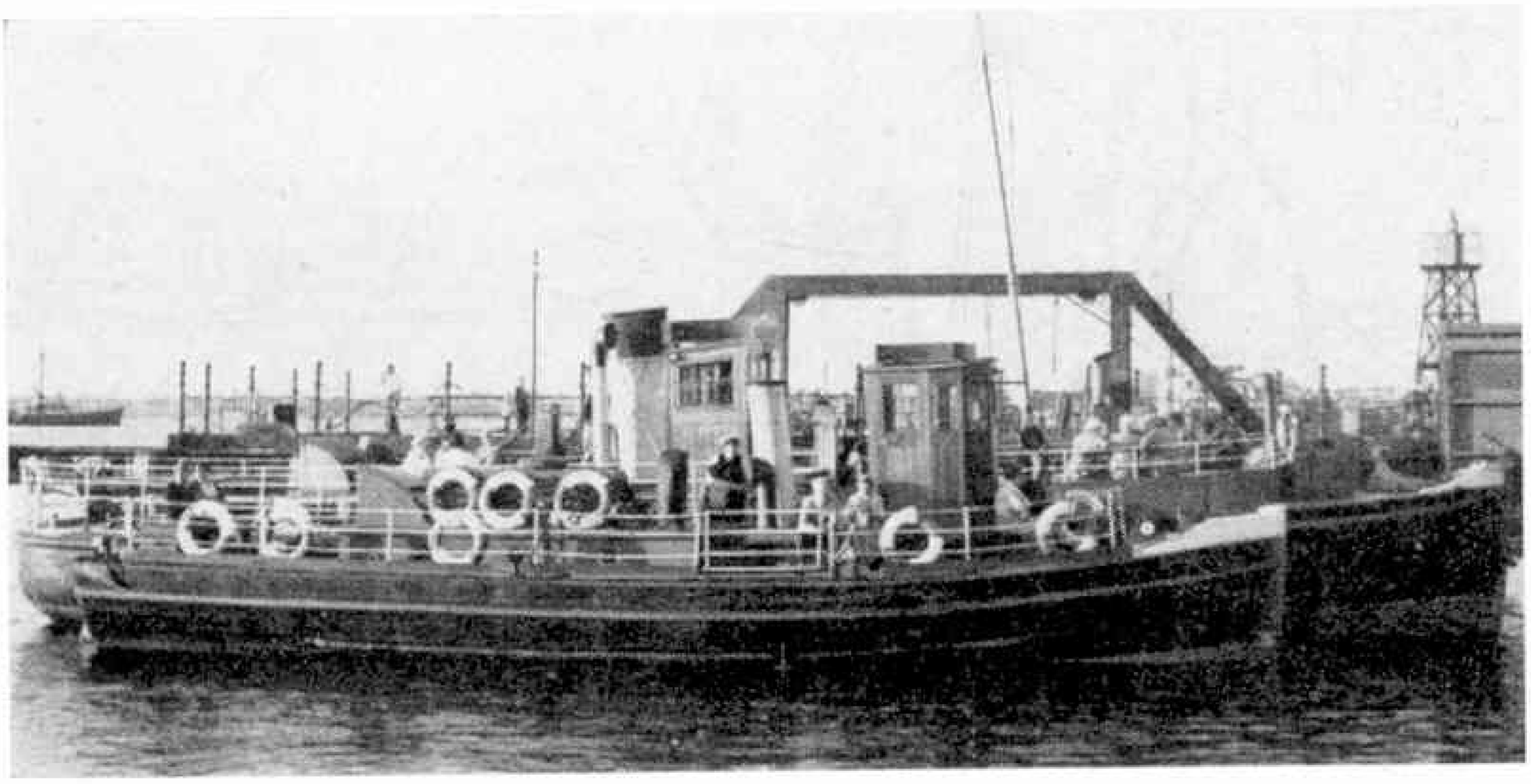
Four Fishplates, set in pairs and overlapped at their holes, are used to form the radiator, and are bolted to the horizontal 2½" Strip 11 and the Double Angle Strip 9.

Parts required to build the Forward Control Lorry: 4 of No. 2; 4 of No. 5; 4 of No. 10; 5 of No. 12; 1 of No. 16; 2 of No. 17; 4 of No. 22; 2 of No. 35; 29 of No. 37a; 24 of No. 37b; 4 of No. 38; 2 of No. 48a; 2 of No. 90a; 1 of No. 52; 4 of No. 111c; 1 of No. 125; 2 of No. 126; 2 of No. 126a; 4 of No. 142c; 2 of No. 189.

Parts required to build the Knife Grinding Machine: 4 of No. 2; 4 of No. 5; 3 of No. 10; 5 of No. 12; 1 of No. 16; 2 of No. 17; 1 of No. 19s; 4 of No. 22; 1 of No. 24; 6 of No. 35; 20 of No. 37; 3 of No. 37b; 6 of No. 38; 2 of No. 48; 2 of No. 90a; 2 of No. 126; 1 of No. 126a; 1 of No. 142c; 1 of No. 155; 1 of No. 186.

From Our Readers

This page is reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.



British Railways to Close a Ferry

British Railways are to close two ferries that have been running for many years. They are the Harwich–Shotley and Harwich–Felixstowe ferries, which link North East Essex and South East Suffolk.

The first of these crosses the River Stour, which takes about eight to ten minutes. The boat usually on this trip is the *Epping*. The journey to Shotley by road is by way of Manningtree, the nearest point at which the river can be crossed by bridge, and is about 20 miles long.

The Felixstowe trip takes about fifteen minutes, crossing the confluence of the rivers Stour and Orwell. The distance by road between these two towns is almost 40 miles. The boat usually doing this trip is the *Brightlingsea*, larger than the *Epping*, for often the crossing is quite rough.

The accompanying photograph shows the *Epping*, with the *Brightlingsea* behind her, tied up at the "Ha'peny Pier" at Harwich.

H. L. Hall (Dovercourt)

The Bridge of the Fort

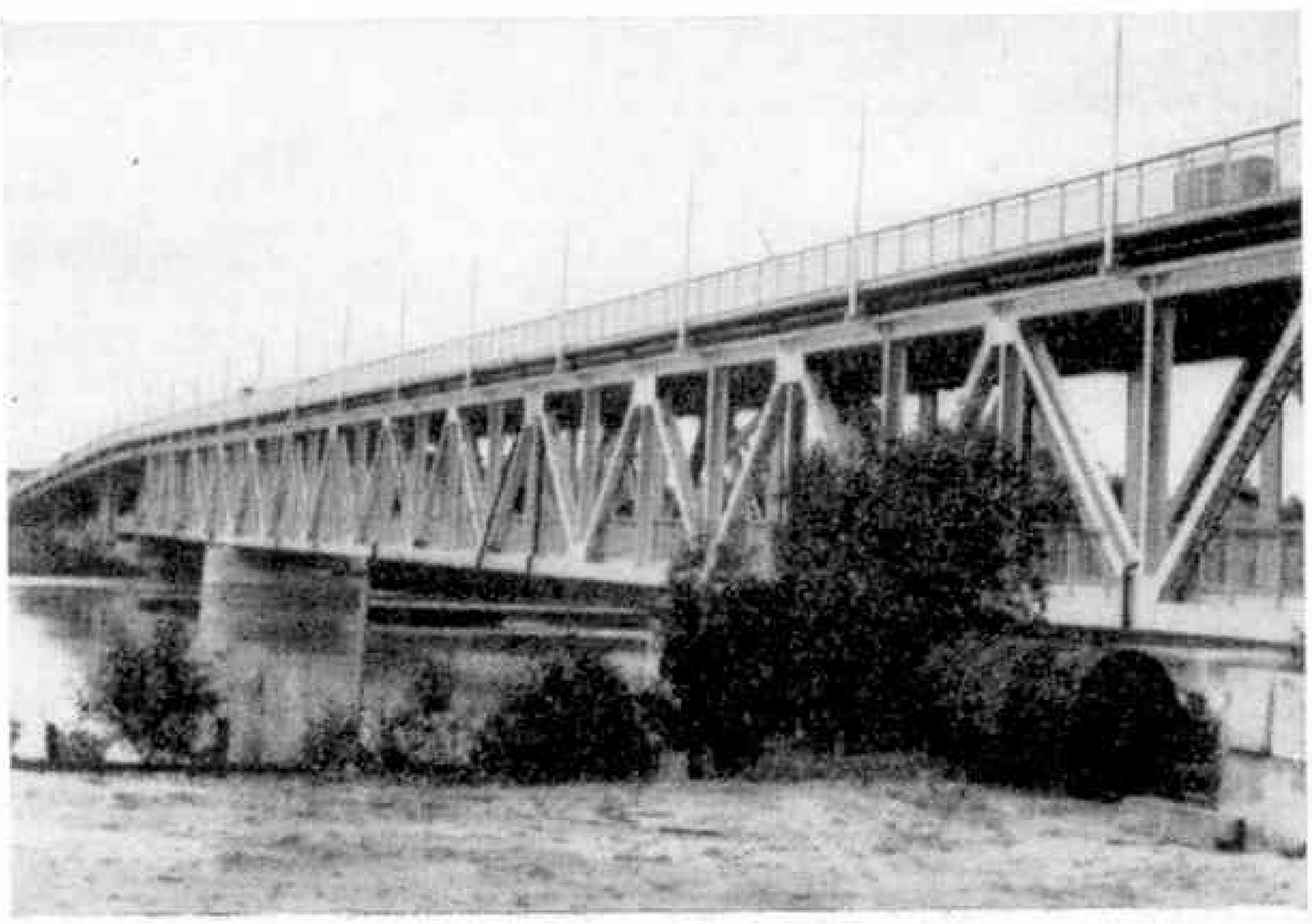
The fine bridge illustrated on this page is in Malaya, and is named after the fort of the marauding Bugis pirates who once terrorised the inhabitants of Klang. It is called Jambatan Kota or the "Bridge of the Fort", and is Malaya's first double-deck bridge. The Sultan of Selangor opened it on 24th June last.

The structure has been described as one of the largest engineering projects undertaken in Malaya. It is double-decked, the first of its kind in South East Asia, and promises to be a tourist attraction for foreign visitors. It is a new landmark in Klang, becoming visible as you approach the town from Kuala Lumpur.

The bridge is a steel and concrete structure, 1,500 ft. long, with its top deck 40 ft. above the water. Of this, 200 yards cross the river in three spans. The longest, in the centre, is 282 ft. long and is the longest clear span of its kind in the Federation. It was completed two months ahead of schedule and is quite an achievement.

The new bridge will speed the passage of merchandise by road between Port Swettenham, on the west coast of Malaya, and Kuala Lumpur. It will also be of great value to local traffic. Both decks allow two-way traffic. The lower one, which is used by cyclists and pedestrians, is on street level.

T. T. J. Chuan (Selangor, Malaya)



"My wife? She's in the chatterbox!"

Fireside Fun

"One last question before I engage you as my valet. Can you tell when an iron is too hot?"

"Certainly, Sir, when the clothes turn brown and start to burn."

* * * *

A little boy asked for a horse for his birthday. His parents thought he was too young for a real horse, so they got him a rocking horse instead. He laid it aside. "What's the matter son?" his father wanted to know. "Don't you like your rocking horse?"

The boy replied, "I wanted a horse made of horse."

* * * *

Extended Credit

Arctic explorer: "An Arctic night lasting a hundred and forty-one days is no joke, I can tell you!"

Listener: "Why, man, it's really marvellous! Fancy being able to say to a creditor: 'Please call again in the morning'."!

* * * *

A college student wrote to his father: "Dear Father, I am in the City, am broke and have no friends. What shall I do?"

His father replied: "Dear Son, make friends at once."

* * * *

First Skater: "What are you laughing at?"

Second Skater: "You remember that fellow at the end of the pond whom we couldn't bear?"

First Skater: "Yes. What about him?"

Second Skater: "The ice couldn't bear him either!'

* * * *

Well Caught!

"You told me you were going to see the dentist yesterday, but I saw you at the cricket match?"

"Yes, Sir. The dentist is the opening bat."

* * * *

"Why are you here again?" asked the magistrate.

"Because of my belief," replied the burglar.

"What belief?"

"I believed the policeman had gone."

* * * *

Fair Question!

"What's an eight-day clock, Mum?" said a little boy to his mother.

"It goes for eight days without winding, dear."

"Then how long does it go if you do wind it, Mum?" persisted the little boy.

BRAIN TEASERS

BOOK TITLES

The collection of letters shown below represent the titles of well-known children's books. The words of the titles are not necessarily in their correct order. Can you discover the titles?

RETPE EHT ELARHW	DASILN SUTERAER
NPA TEERP	ENSIM ONSSOLOM GNIK
EOSRUC ISOBNNRO	IHOMNACS ETH ALTS FO

A WEIRD BILL

A man hired a horse from the village blacksmith. On asking for his bill at the end of the day he received the following:

	s.	d.
OSFORADA	9	6
AFORTHOS	2	6
ASSUINHIM	3	6
ATEKINHIMUMAGEN		6
	16	0

Can you make sense of the various items charged for?

ANSWERS TO LAST MONTH'S PUZZLES

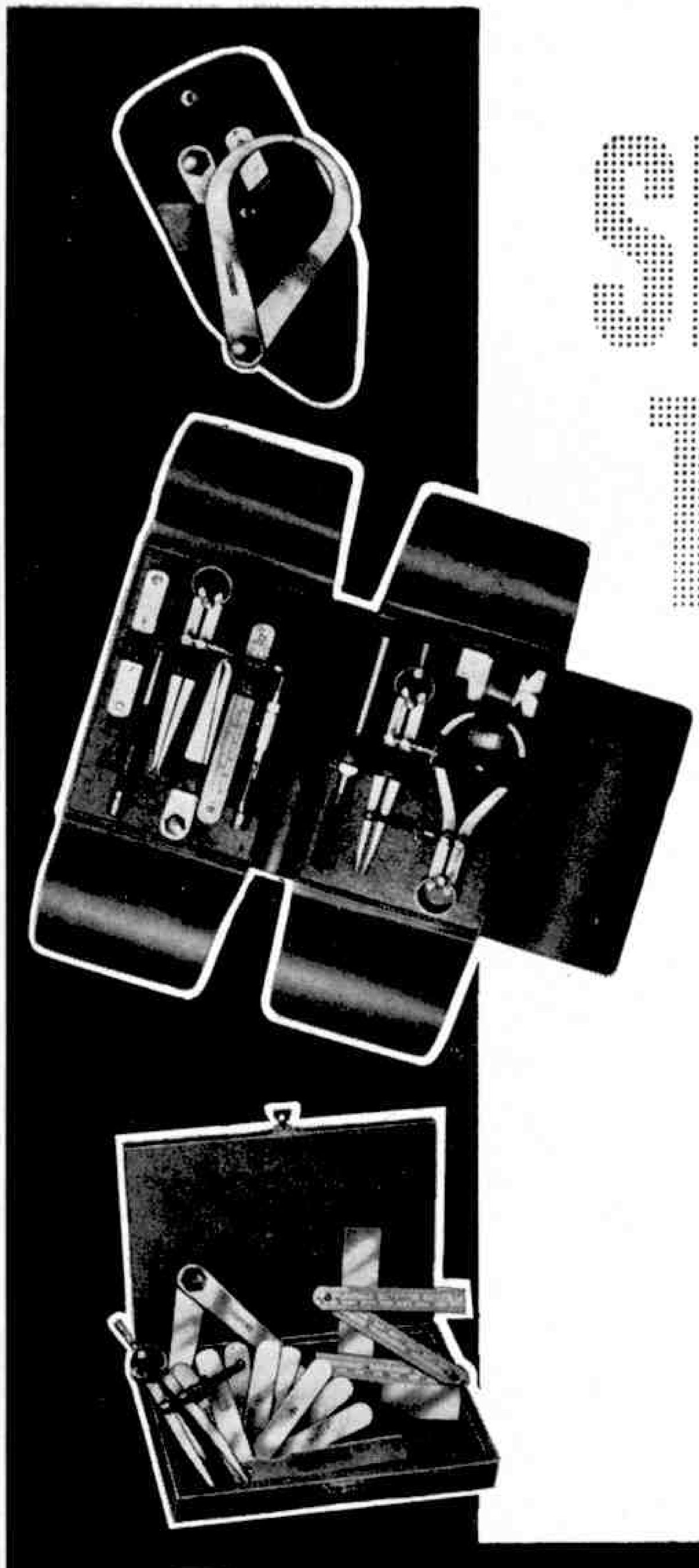
A Number Puzzle

There seem to be several solutions to this puzzle, and one of them is shown in the adjacent sketch. In this solution it will be seen that the numbers are arranged in an orderly manner, the smallest numbers falling in the same column as the largest, and so on.

10	11	14	15
9	12	13	16
8	5	4	1
7	6	3	2

Indian Wisdom

The two words spoken by the Indian wise man to the Chief's sons were "Change Horses".



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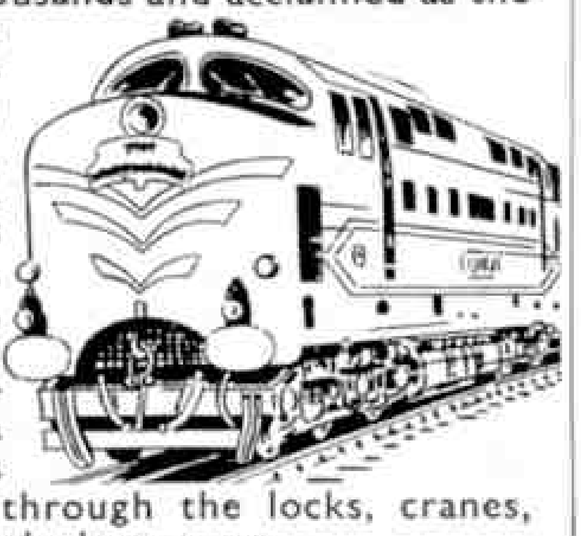

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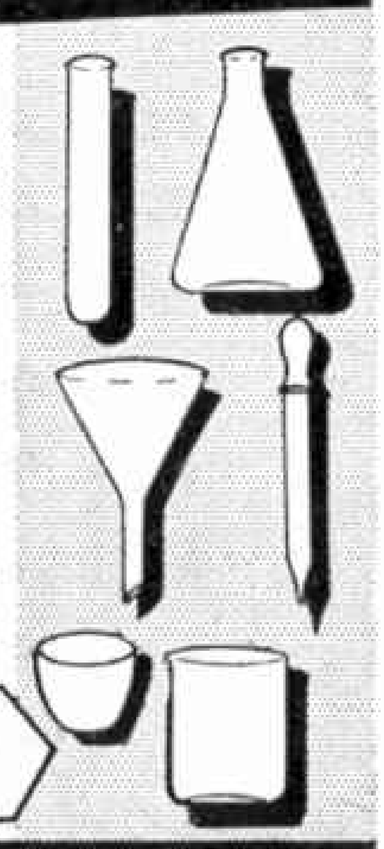

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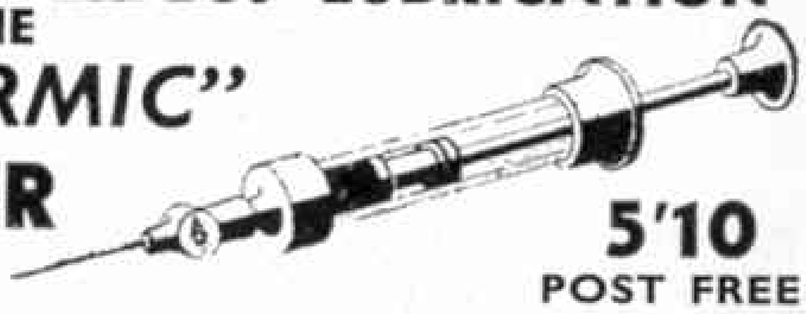

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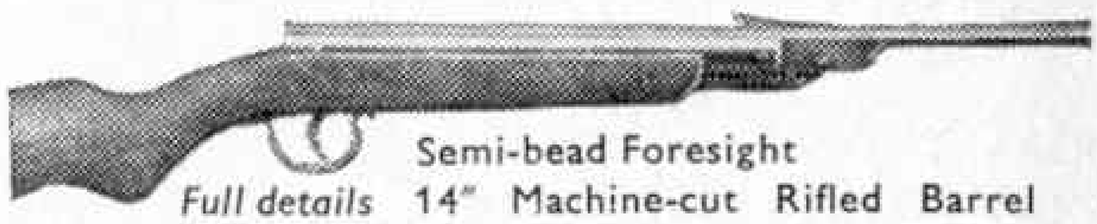

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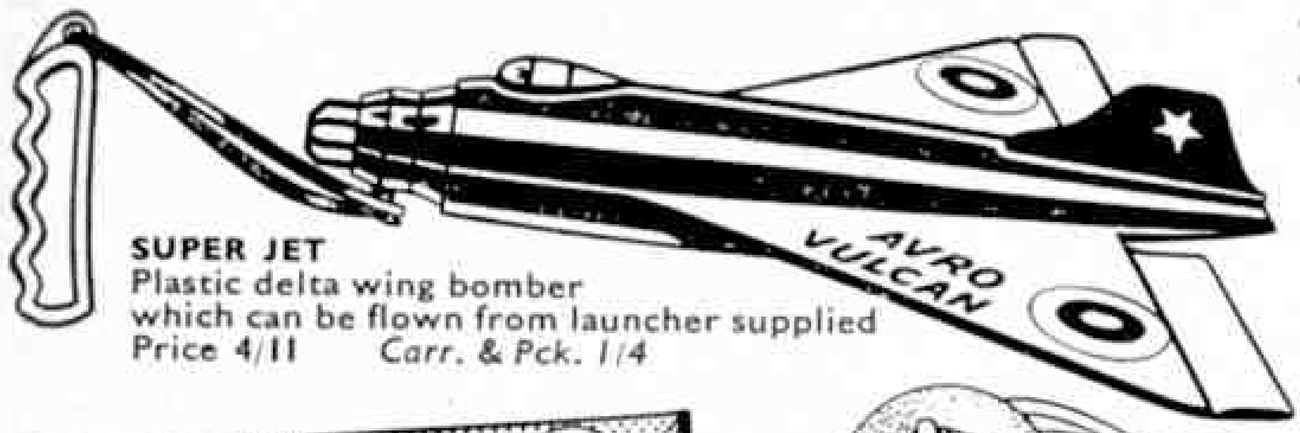

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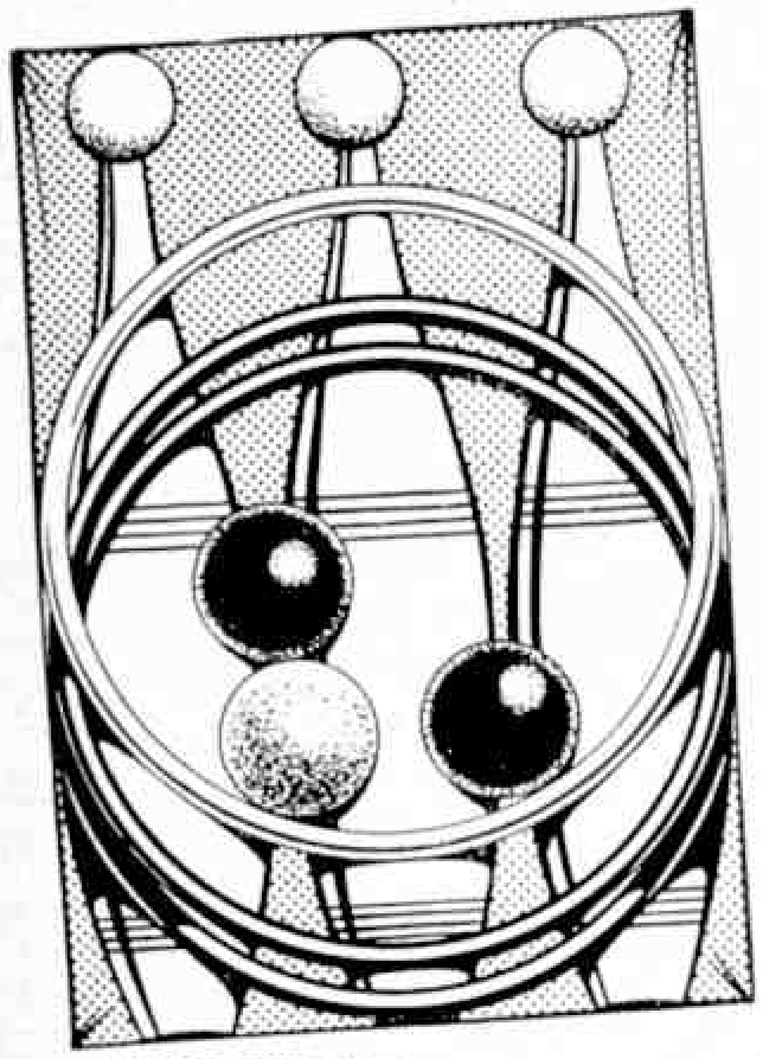

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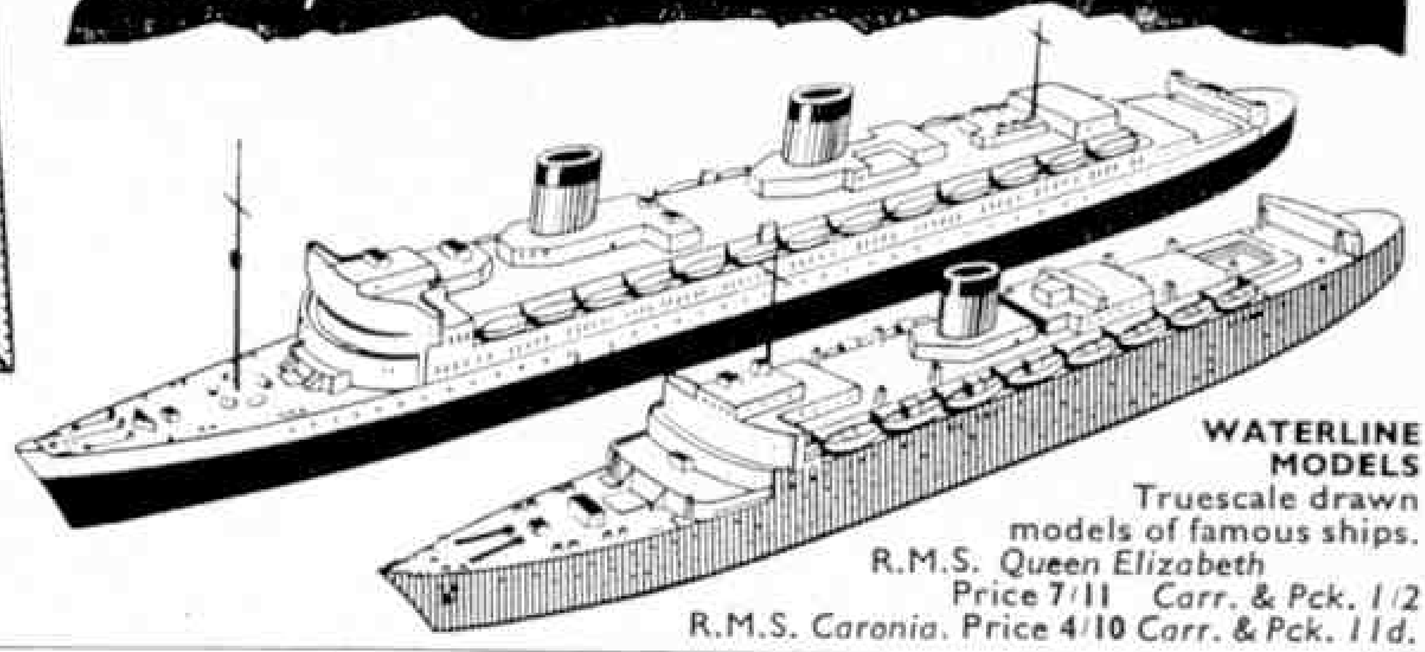

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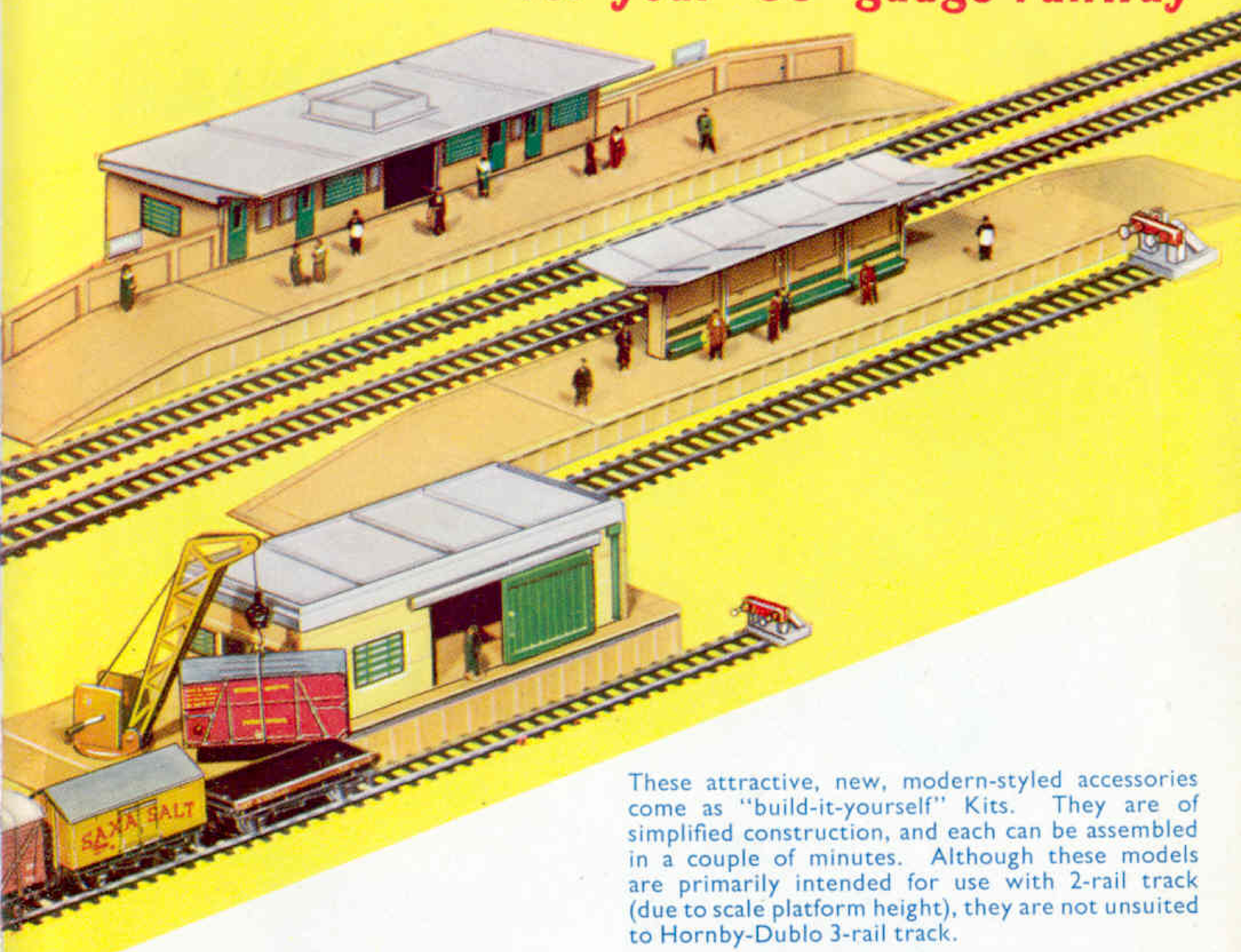

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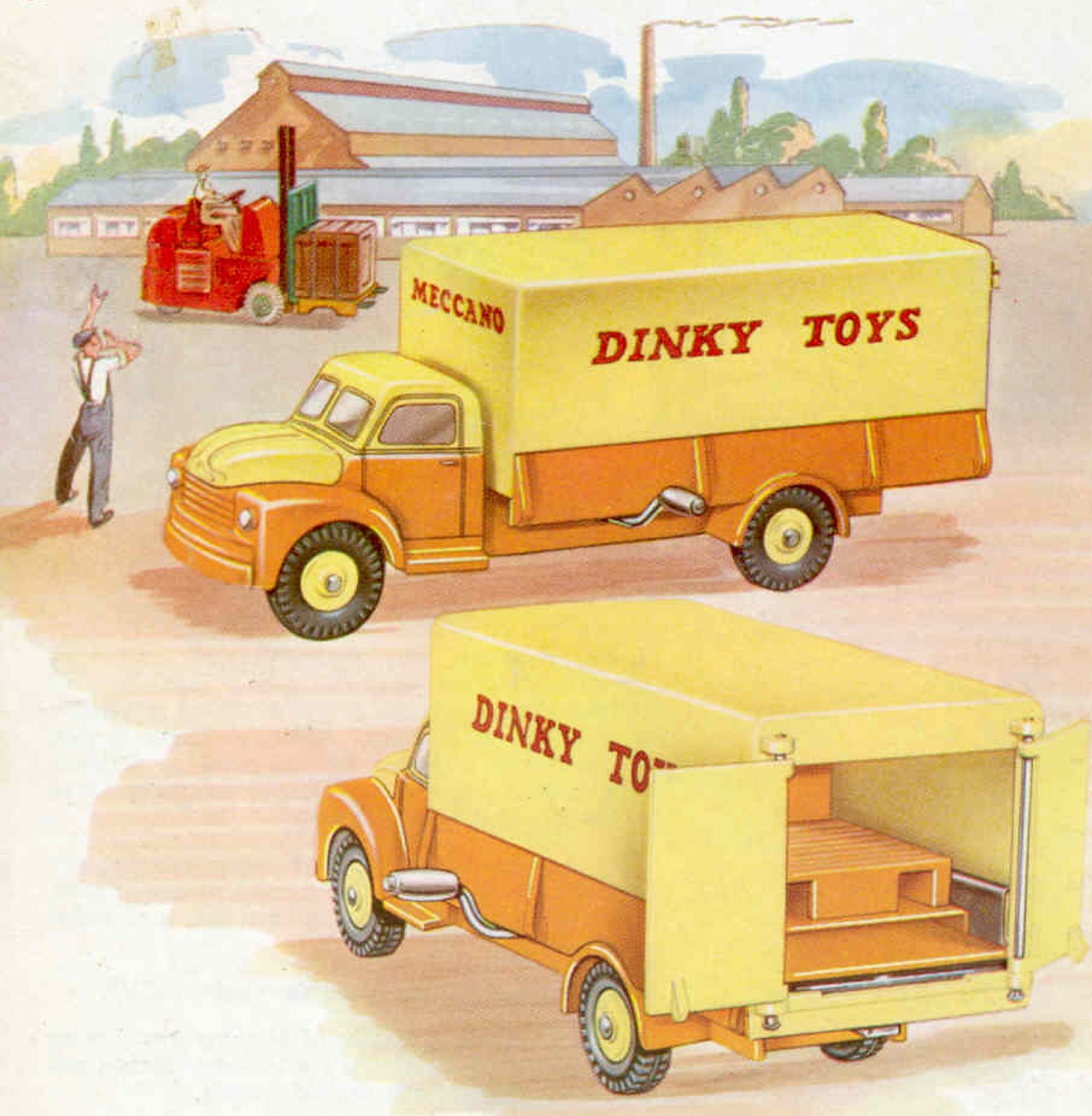

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